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IMAGERY ANALYSIS

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STAFF

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PHOTOGRAPHIC INTELLIGENCE REPORT

ANALYSIS OF PROBABLE LONG RANGE SAM COMPLEX CONFIGURATIONS

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DATE Feb 1967

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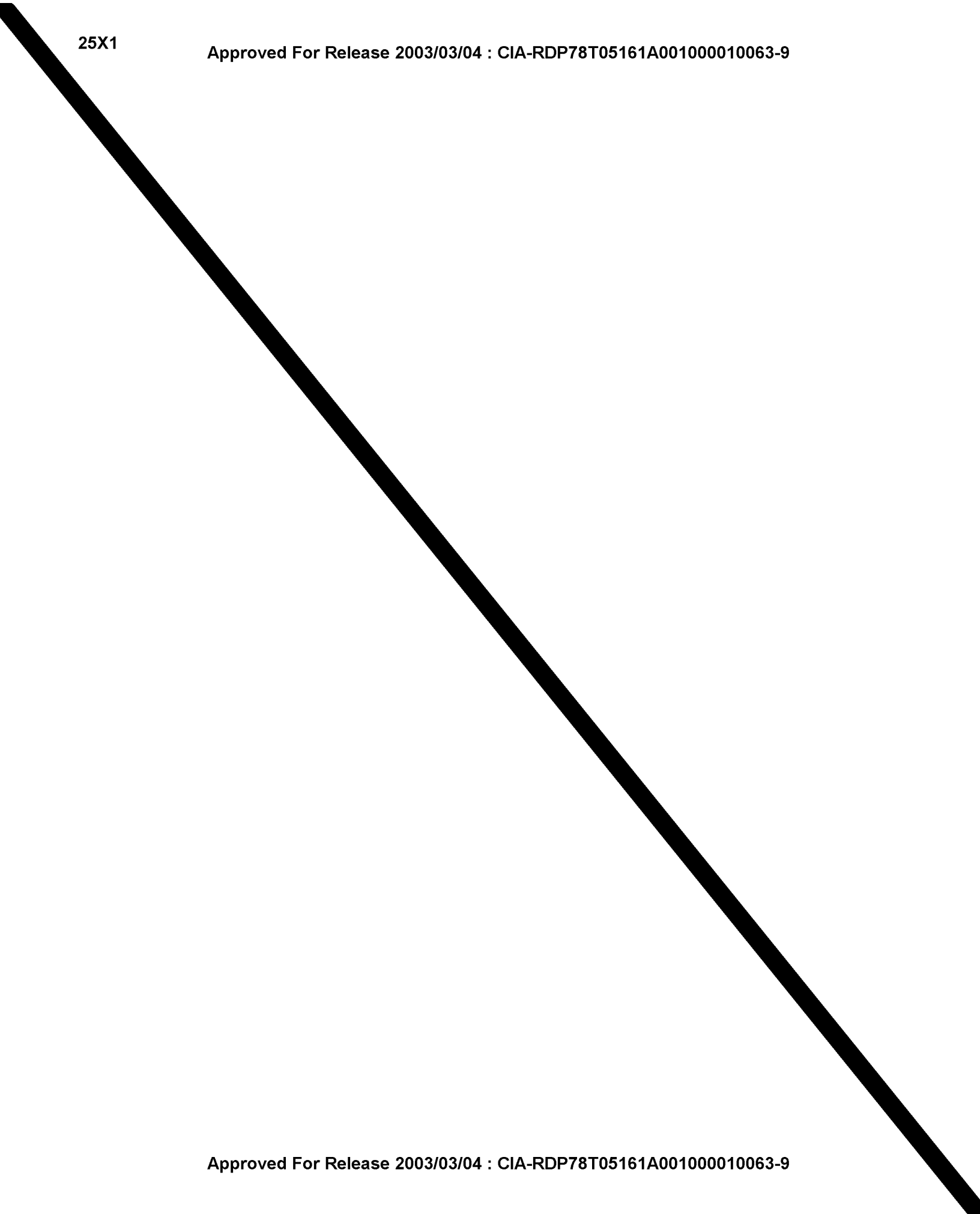

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ANALYSIS OF PROBABLE LONG RANGE SAM COMPLEX CONFIGURATIONS

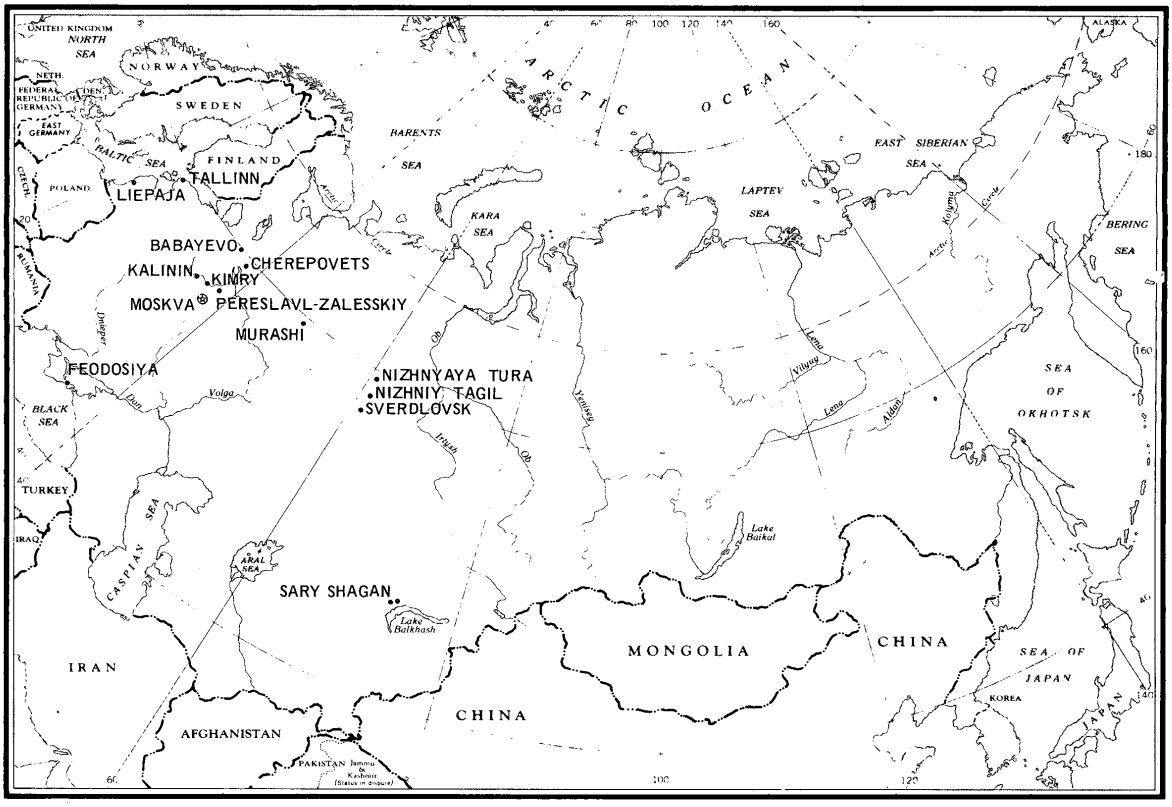

FIGURE 1. PROBABLE LONG RANGE SAM LAUNCH COMPLEXES DISCUSSED IN THIS REPORT

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ANALYSIS OF PROBABLE LONG RANGE SAM COMPLEX CONFIGURATIONS

INTRODUCTION

This report presents an analysis of fourteen of the probable long range SAM launch complexes deployed in the Soviet Union (Figure 1). These complexes, along with pertinent timing data, are listed in Table I in chronological order of first observation. Mensural data, including dimensions and critical angles, were derived for the complex configurations and correlated with information on deployment timing* Four general categories of complex configurations emerge from the analysis--a two-site complex, two types of three-site complexes, and the five-site complex. Although deployment of the complexes is continuing, a general trend in the types of configurations observed during the period [redacted] to [redacted] is apparent. 25X1 X1

GENERAL INFORMATION

Fourteen probable long range SAM launch complexes were identified from overhead photography between [redacted] As the number of complexes increased, a variation in the number and physical arrangement of launch sites within complexes emerged. At the same time, these variations could apparently be grouped into several categories of configurations and the categories appeared to be related to the chronological order of deployment for the complexes. The purpose of this report is to provide comparative mensuration for all fourteen complexes indicated, to determine the degree of similarity or difference between these configurations, and attempt to relate the differences in these configurations to a deployment time table. 25X1

When this project was initiated, only one launch complex consisting of two sites had been identified--Sary Shagan Probable Long Range SAM Complex 2. While dimensions have been presented for this launch complex on the same basis as for the others, it remains a separate entity in this report and is not a part of the conclusions drawn.

From the remaining thirteen complexes, three distinct configurations have emerged--the five-site configuration and two types of three-site

* All measurements have been made by the NPIC Technical Intelligence Division.

configurations. To provide a realistic basis on which to compare all three, points were selected at features common to all complexes. The points selected were the central control area of each launch site (Annotations A, B, C, D, and E), and the central control area of the electronics site (Annotation F)* Distances and angular relationships were then derived between common points at the complexes. In some cases, certain limitations made it necessary to estimate the points selected, or arbitrarily designate them. This was done for the Sverdlovsk Complex (Figure 16), for example, because of marginal photo quality. In the case of other installations such as Kalinin (Figure 27), the complex is in early stages of construction and the central control positions poorly defined. At the Kalinin, Pereslavl-Zalesskiy and Babayevo complexes, the central control positions of the electronic site (Point F) is not constructed, however, the point selected is the same, relatively, for the three installations. Detailed mensuration of the Babayevo complex (Figures 28 and 29) was not possible, since only the survey lines were present at the time the mensuration was performed. These same survey lines have been included for the Pereslavl-Zalesskiy complex (Figures 24 and 25) since they illustrate the relation between the survey lines and the construction which follows.

DISCUSSION

Presently, four probable long range SAM launch complexes have been identified which consist of five launch sites each--Cherepovets, Liepaja, Tallinn, and Murashi. Based upon the mensural data shown in this report, it can be seen that a close degree of similarity exists among these complexes (Figures 2-9). Although some discrepancies exist, all are laid out in a similar, symmetrical fashion. Launch sites A, C, and E are located nearest the electronic site, while launch sites B and D are further removed from the electronic site. This group constitutes the earliest probable long range SAM launch complexes to be deployed (Table I and Figure 30). No launch complex consisting of five sites has been identified since the one near Murashi, in

X1 [redacted]

The complexes consisting of three launch sites each, fall into two general categories designated "Kimry-Type" and "Kalinin-Type" after the first good example from each category to be identified. The Kimry-Type results from the center launch site lying at a greater distance from the

* The order of presentation for Figures 2-29 represents the chronological order of first observation of the various complexes.

electronic site than do the launch sites to either side of it. The complexes analyzed in this report, which display this configuration, include those at Feodosiya, Nizhniy Tagil, Sary Shagan Launch Complex 1, Sverdlovsk, Nizhnyaya Tura, and Kimry (Figures 10-13 and 16-23).

Deployment of these complexes followed that of the five-site complexes and appears to represent the transition from a five to a three-site arrangement. It is apparent that the three launch sites in a Kimry-Type complex are laid out in the same manner as three fifths of a five-site complex. At the three complexes in the Urals, sufficient area was enclosed to permit the construction of five launch sites, although only three have developed. This is not true at Feodosiya, Sary Shagan Launch Complex 1, or Kimry where the location of the security fence limits these complexes to three sites only.

The "Kalinin-Type" configuration is characterized by an arrangement where all three launch sites are nearly equidistant from the electronic site. Thus, all three launch sites are abreast of each other, rather than having the center launch site located well out in front. Complexes displaying this configuration, of those considered in this report, include Pereslavl-Zalesskiy, Kalinin, and Babayevo (Figures 24-29). Deployment of this configuration began after that of the Kimry-Type complexes (Figure 30).

CONCLUSIONS

Deployment of the probable long range SAM system continues, and while configurations may well change in the future, these trends were recognizable as of [redacted]

a. Three major categories of configurations for the probable long range SAM launch complexes are recognizable. These are the five-site complex and the "Kimry" and "Kalinin" types of three-site complexes.

b. There is a correlation between construction timing and the categories of complex configurations. Initial deployment of the probable long range SAM system began with five-site complexes in the time interval [redacted] A transition in deployment from five-site to one type of three-site complexes (Kimry-Type) occurred in [redacted] Deployment of the Kalinin-Type three-site launch complexes had begun by early [redacted] exclusive deployment of this configuration had continued.

c. On the basis of current deployment trends, the preponderance of probable long range SAM launch complexes deployed in the future will probably

be of three-sites or less. Because of the experience in construction of five-site complexes, future use of these in critical areas of the defensive posture cannot be completely discounted.

EPILOGUE

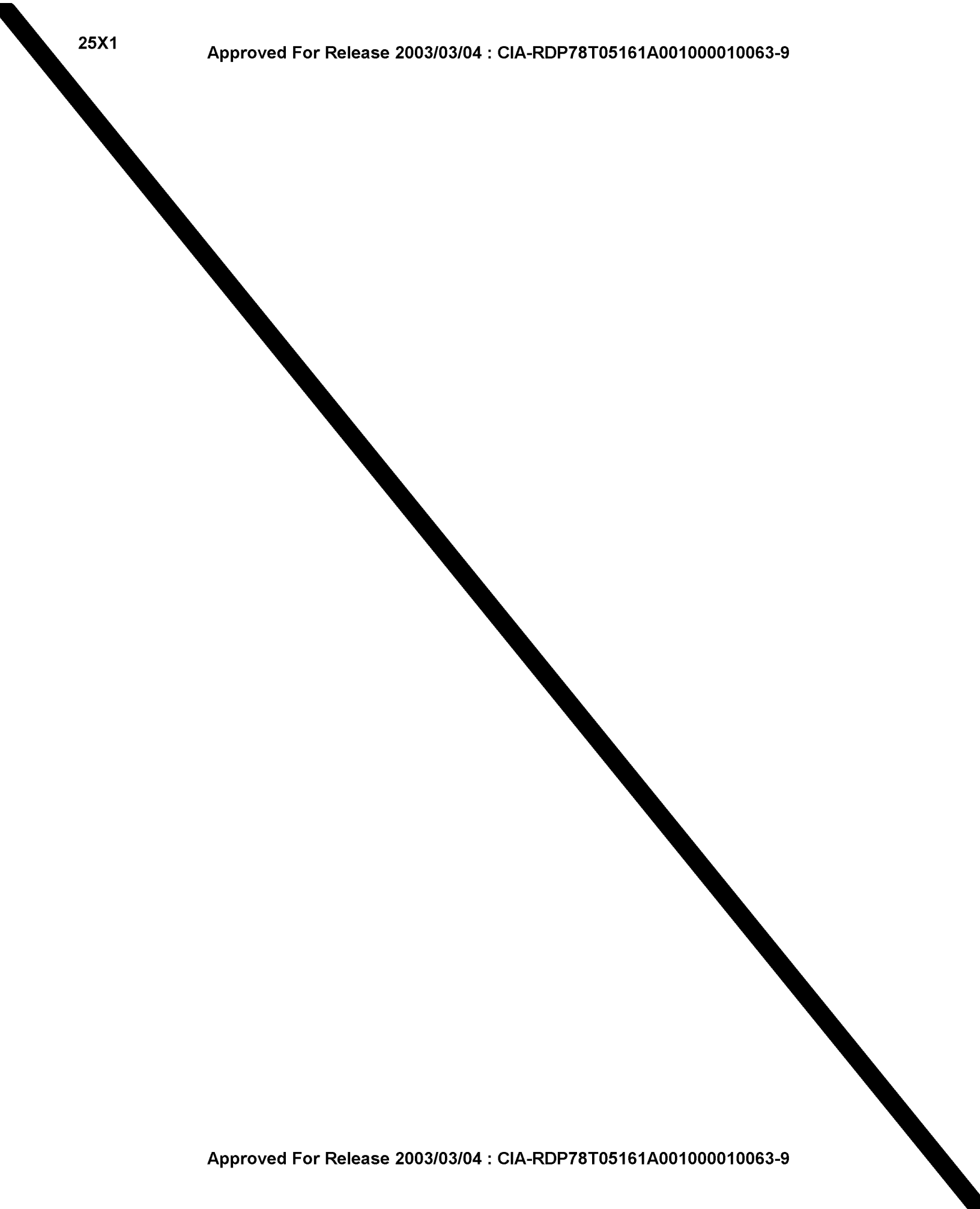
Information presented in this report is for the first fourteen probable long range SAM launch complexes identified, exclusive of the three at Leningrad. Since X1 a total of ten additional complexes have been identified. In alaphabetical order, these complexes are located at Angarsk, Kapustin Yar Missile Test Center, Khabarovsk, Kostroma, Krasnoyarsk, Kuressaare, Mozhaysk, Plesetsk, Tomsk, and Volgograd. Six of these complexes--Angarsk, Khabarovsk, Kostroma, Mozhaysk, Plesetsk, and Volgograd are the "Kalinin" configuration, while the complex at Krasnoyarsk is of the "Kimry" configuration.

Three complexes, Kapustin Yar, Kuressaare, and Tomsk,which are presently in early stages of construction, show departures from the "Kalinin" and "Kimry" type configurations. The Tomsk Probable Long Range SAM Complex has a configuration which is the reverse of the "Kimry-Type," with launch sites A and C located a greater distance than site B from the electronics area.

The newest complexes identified, at Kapustin Yar Missile Test Center and Kuressaare, presently consist of two launch sites only. Although these installations are in early to mid-stages of construction, this two-site configuration may indicate a further deployment trend for the probable long range SAM system.

REFERENCES

25X1



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DOCUMENTS

1. CIA. [redacted] Possibly Deployed Probable Long Range SAM Launch Sites at Sary Shagan Missile Test Center, USSR, October 1966 (TOP SECRET [redacted] X1 X1

2. NPIC. [redacted] Construction Chronology of Deployed Probable ABM and Long Range SAM Launch Complexes (TOP SECRET [redacted] X1 25X1

REQUIREMENT

C-RR6-83,840

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TABLE I

DEPLOYMENT DATES, PROBABLE LONG RANGE SAM LAUNCH COMPLEXES

(COMPLEXES ARE LISTED IN CHRONOLOGICAL ORDER OF FIRST OBSERVATION)

Installation
1. Cherepovets (59-06N 38-10E)
2. Tallinn (59-24N 24-19E)
3. Liepaja (56-33N 21-11E)
4. Murashi (59-28N 48-50E)
5. Nizhniy Tagil (58-06N 60-53E)
6. Sary Shagan Launch Complex 1 (46-23N 72-52E)
7. Sary Shagan Launch Complex 2 (46-05N 73-27E)
8. Sverdlovsk (57-04N 61-01E)
9. Feodosiya (49-09N 35-44E)
10. Nizhnyaya Tura (58-46N 59-54E)
11. Kimry (56-46N 37-20E)
12. Pereslavl-Zalesskiy (56-45N 38-38E)
13. Kalinin (56-36N 35-53E)
14. Babayevo (59-33N 35-21E)

* Indicates possible negation date due to partial cloud cover or cloud shadow obscuring target area.

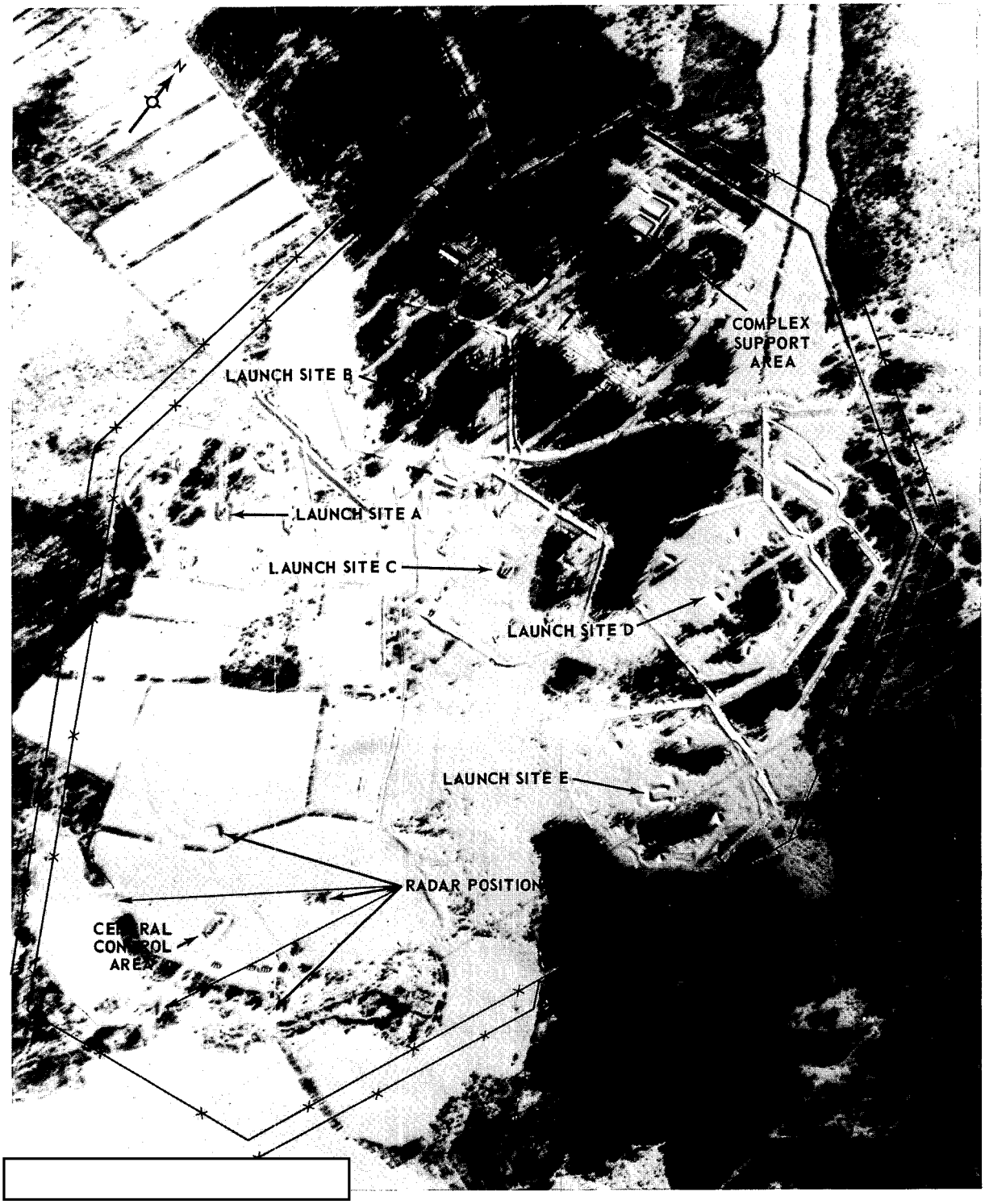
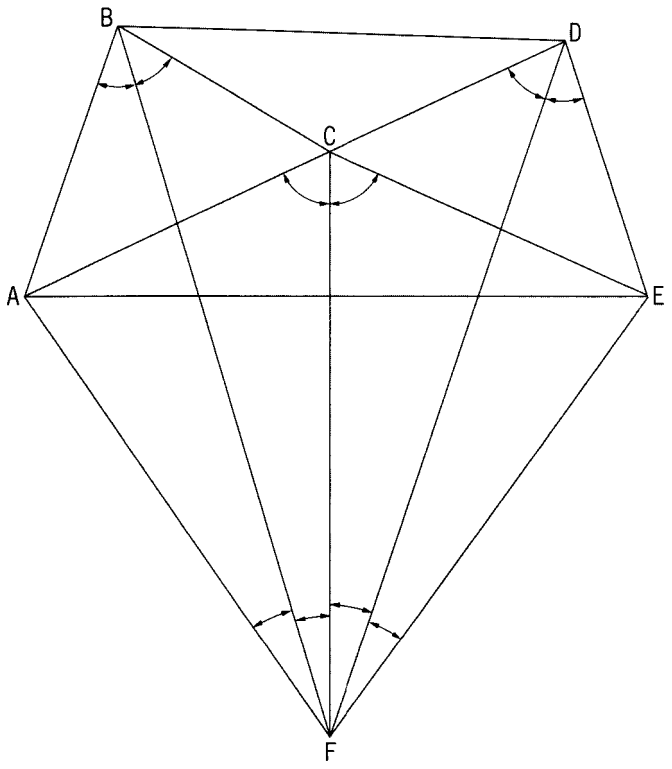


FIGURE 2. CHEREPOVETS PROBABLE LONG RANGE SAM LAUNCH COMPLEX



DIMENSIONS (FEET)

AB = 1490	BD = 2300	DE = 1425
AC = 1750	BF = 3875	DF = 3825
AE = 3240	CD = 1330	EF = 2820
AF = 2785	CE = 1805	
BC = 1305	CF = 3025	

NOTE:

All distances are considered to be accurate within ±50' or 2%, which ever is greater

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SCALE: ONE INCH = ONE THOUSAND FT

FIGURE 3. DIMENSIONS AND CRITICAL ANGLES, CHEREPOVETS PROBABLE LONG RANGE SAM LAUNCH COMPLEX

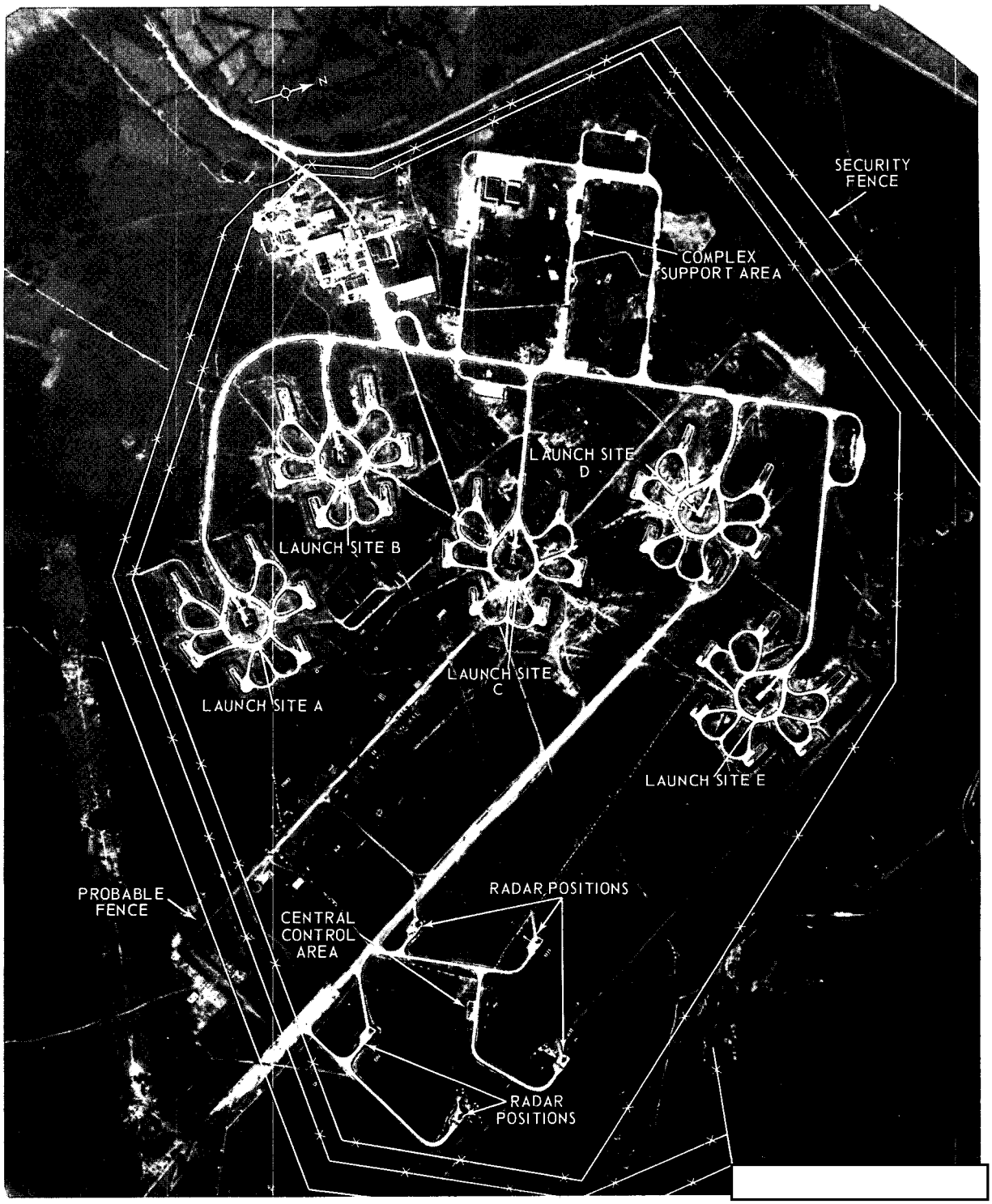
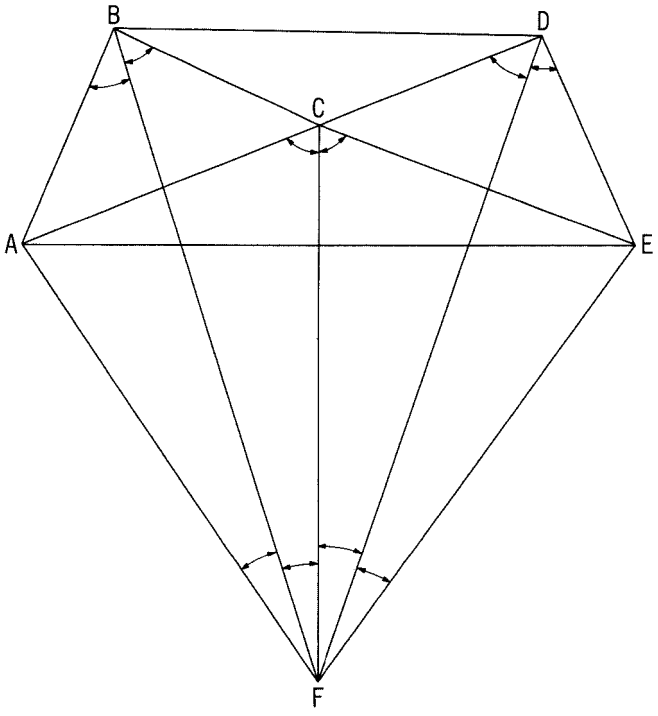


FIGURE 4. TALLINN PROBABLE LONG RANGE SAM LAUNCH COMPLEX



DIMENSIONS (FEET)

AB = 1230	CD = 1240
AC = 1750	CE = 1740
AE = 3245	CF = 2905
AF = 2740	DE = 1200
BC = 1205	DF = 3585
BD = 2265	EF = 2825
BF = 3530	

NOTE: All distances are considered to be accurate within ±50' or 2%, which ever is greater

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SCALE: ONE INCH = ONE THOUSAND FT

FIGURE 5. DIMENSIONS AND CRITICAL ANGLES, TALLINN PROBABLE LONG RANGE SAM LAUNCH COMPLEX

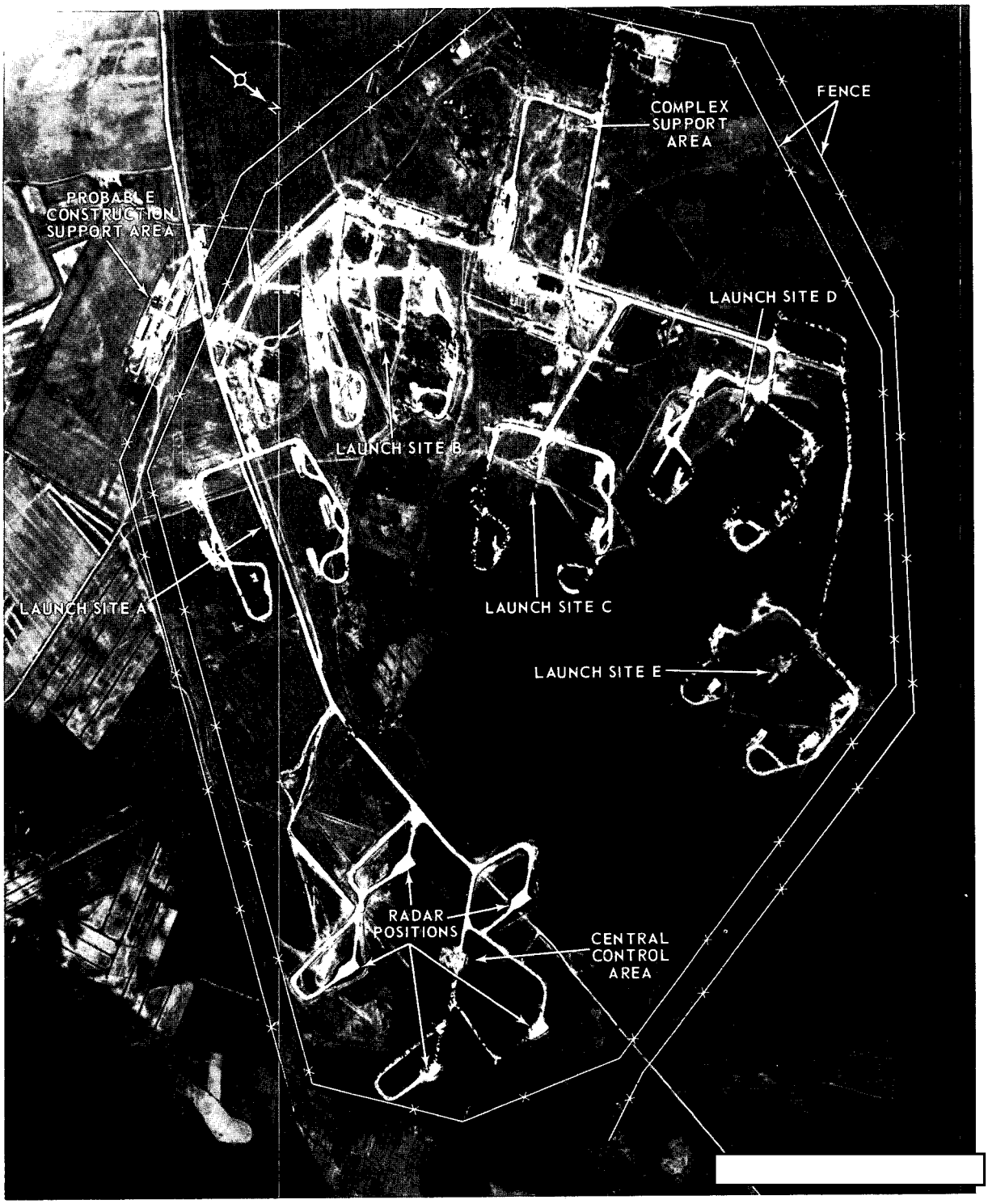
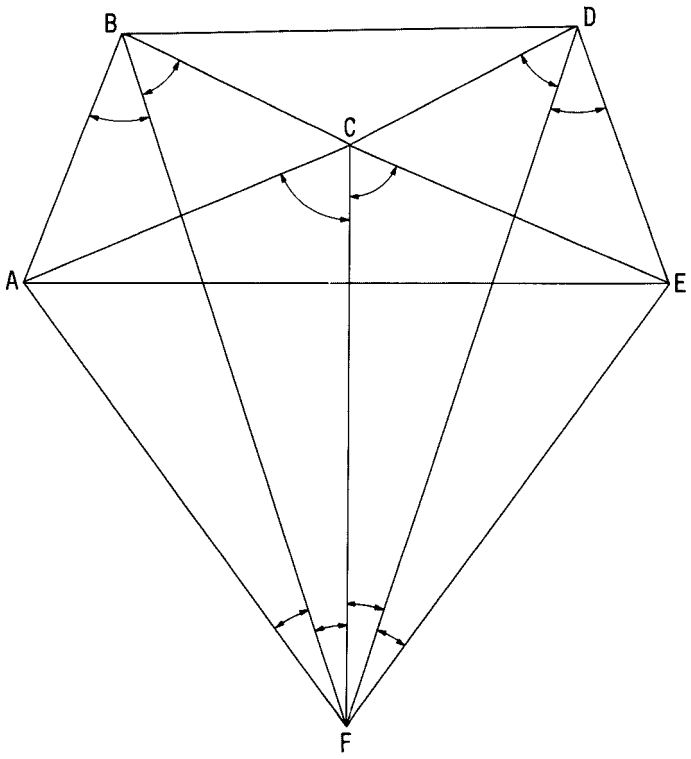


FIGURE 6. LIEPAJA PROBABLE LONG RANGE SAM LAUNCH COMPLEX



DIMENSIONS (FEET)

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AC = 1860	BF = 3725	DF = 3825
AE = 3365	CD = 1335	EF = 2845
AF = 2810	CE = 1850	
BC = 1250	CF = 3050	

NOTE:

All distances are considered to be accurate within ±50' or 2%, which ever is greater

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SCALE: ONE INCH = ONE THOUSAND FT

FIGURE 7. DIMENSIONS AND CRITICAL ANGLES, LIEPAJA PROBABLE LONG RANGE SAM LAUNCH COMPLEX

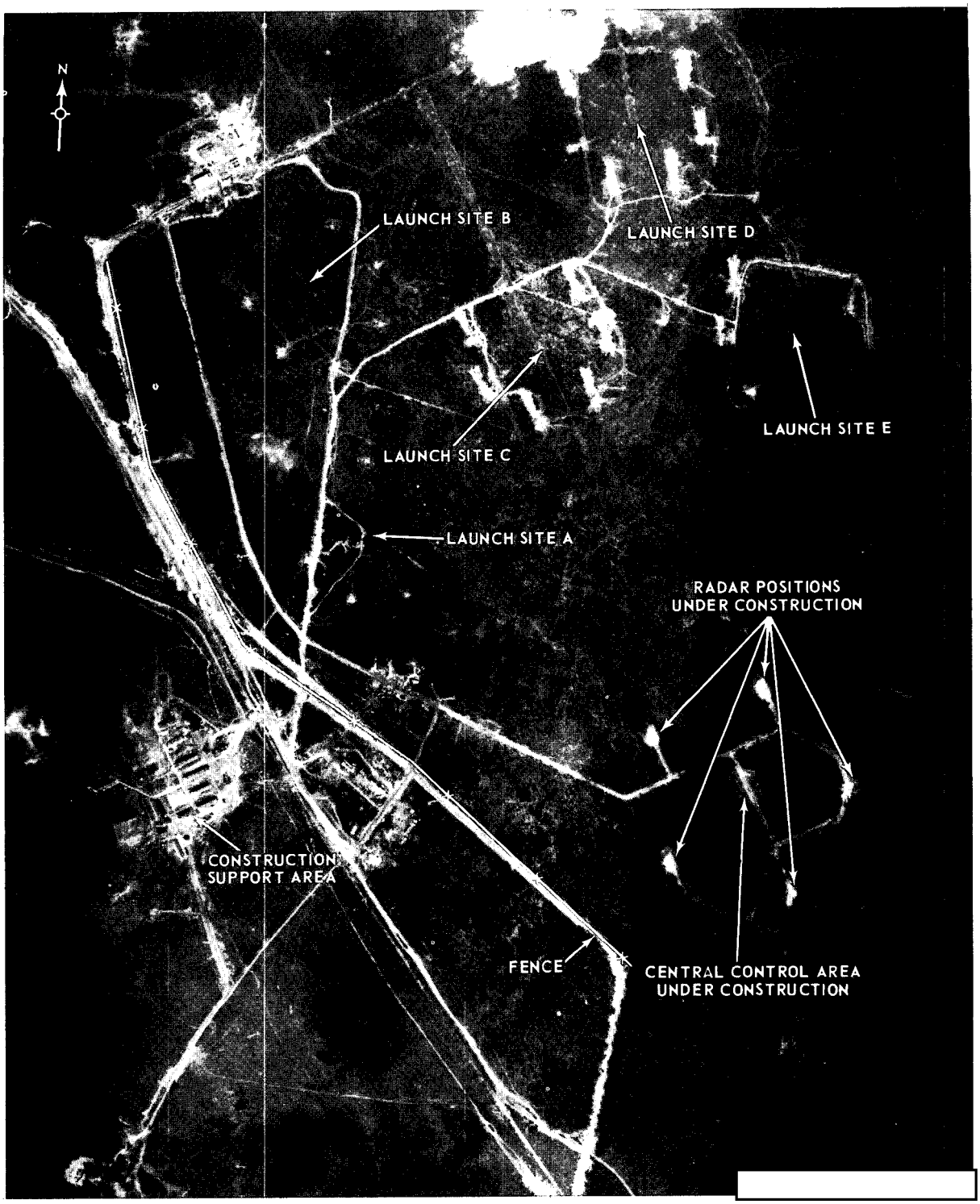

FIGURE 8. MURASHI PROBABLE LONG RANGE SAM LAUNCH COMPLEX

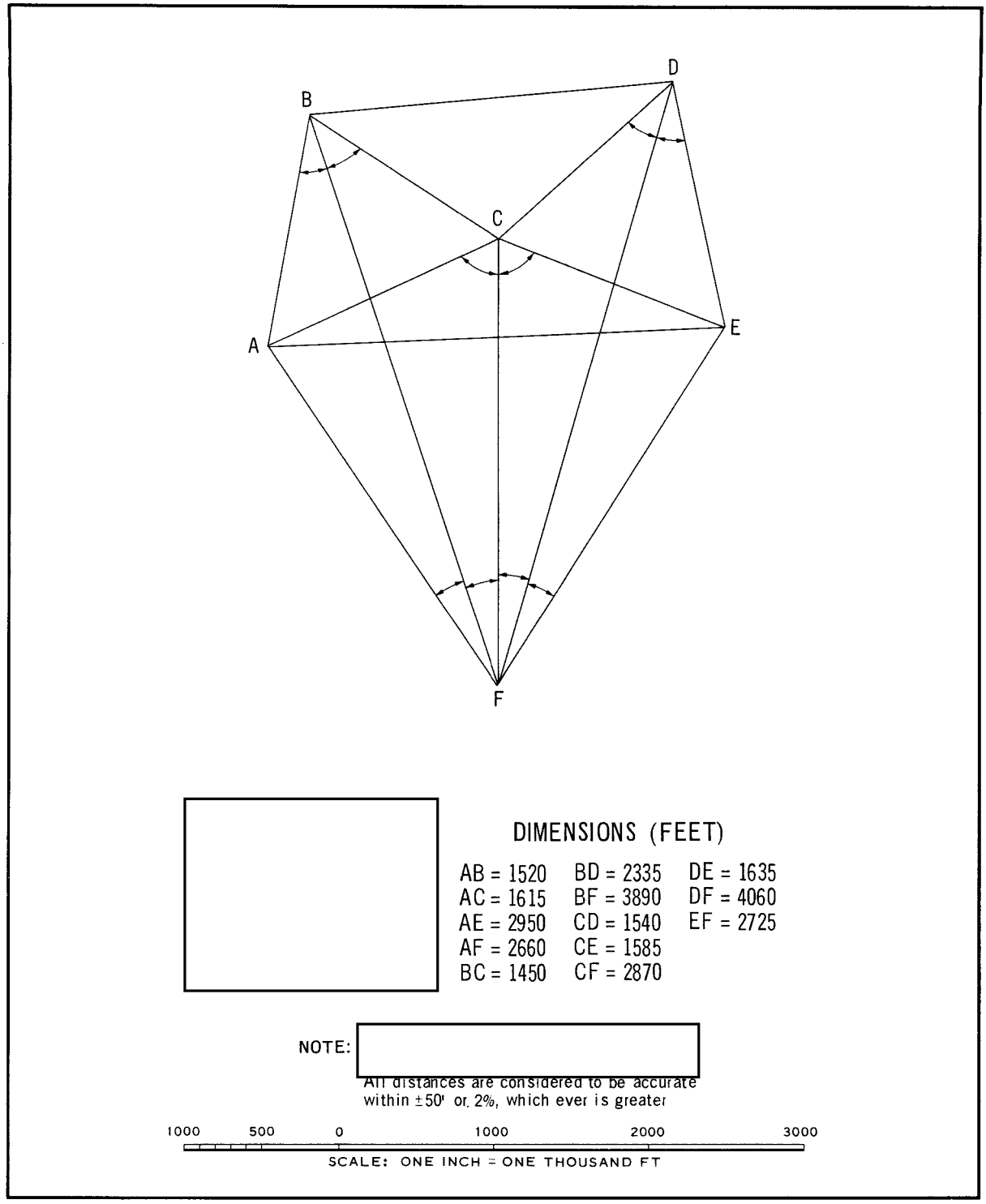

FIGURE 9. DIMENSIONS AND CRITICAL ANGLES, MURASHI PROBABLE LONG RANGE SAM LAUNCH COMPLEX

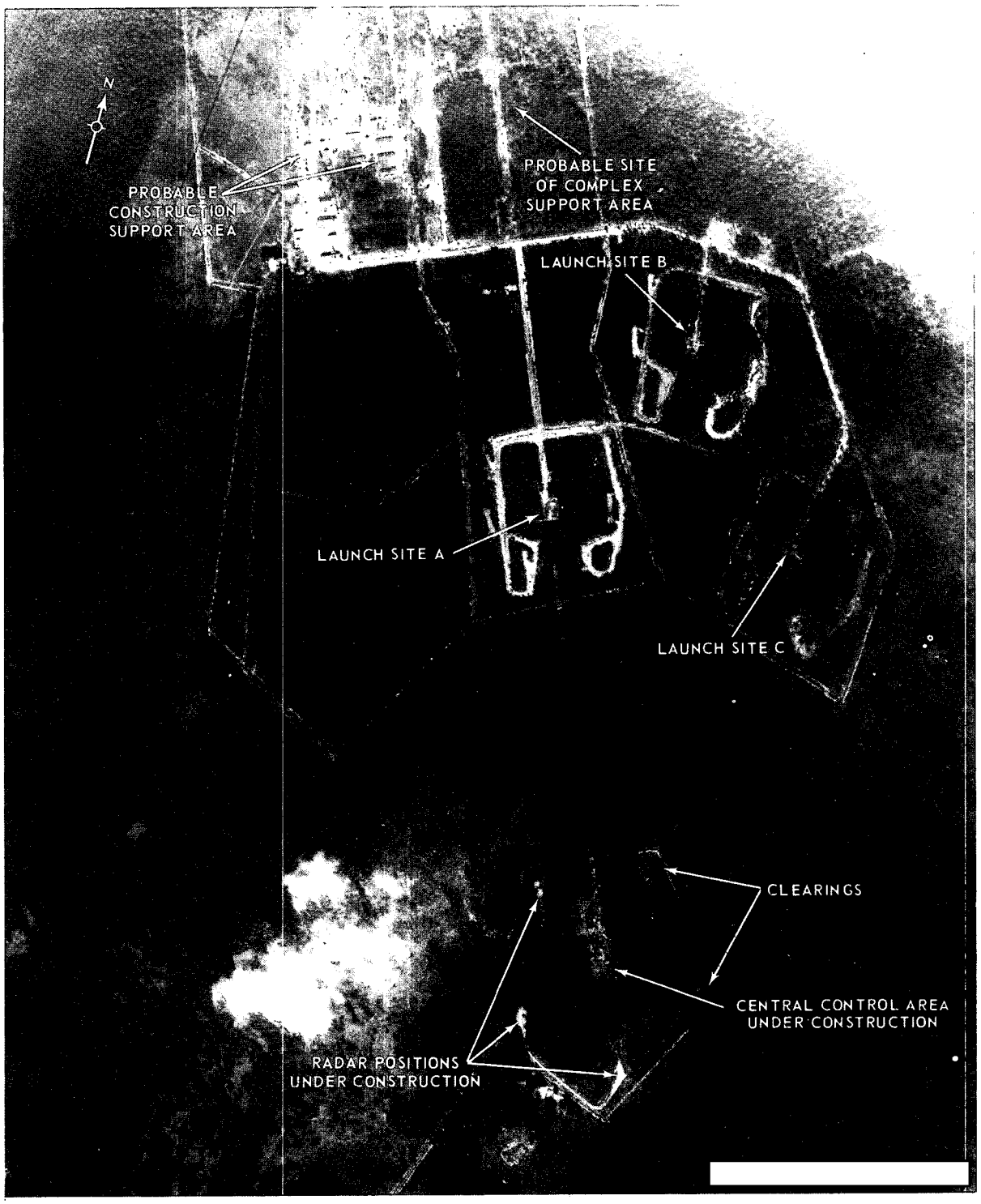

FIGURE 10. NIZHNIY TAGIL PROBABLE LONG RANGE SAM LAUNCH COMPLEX

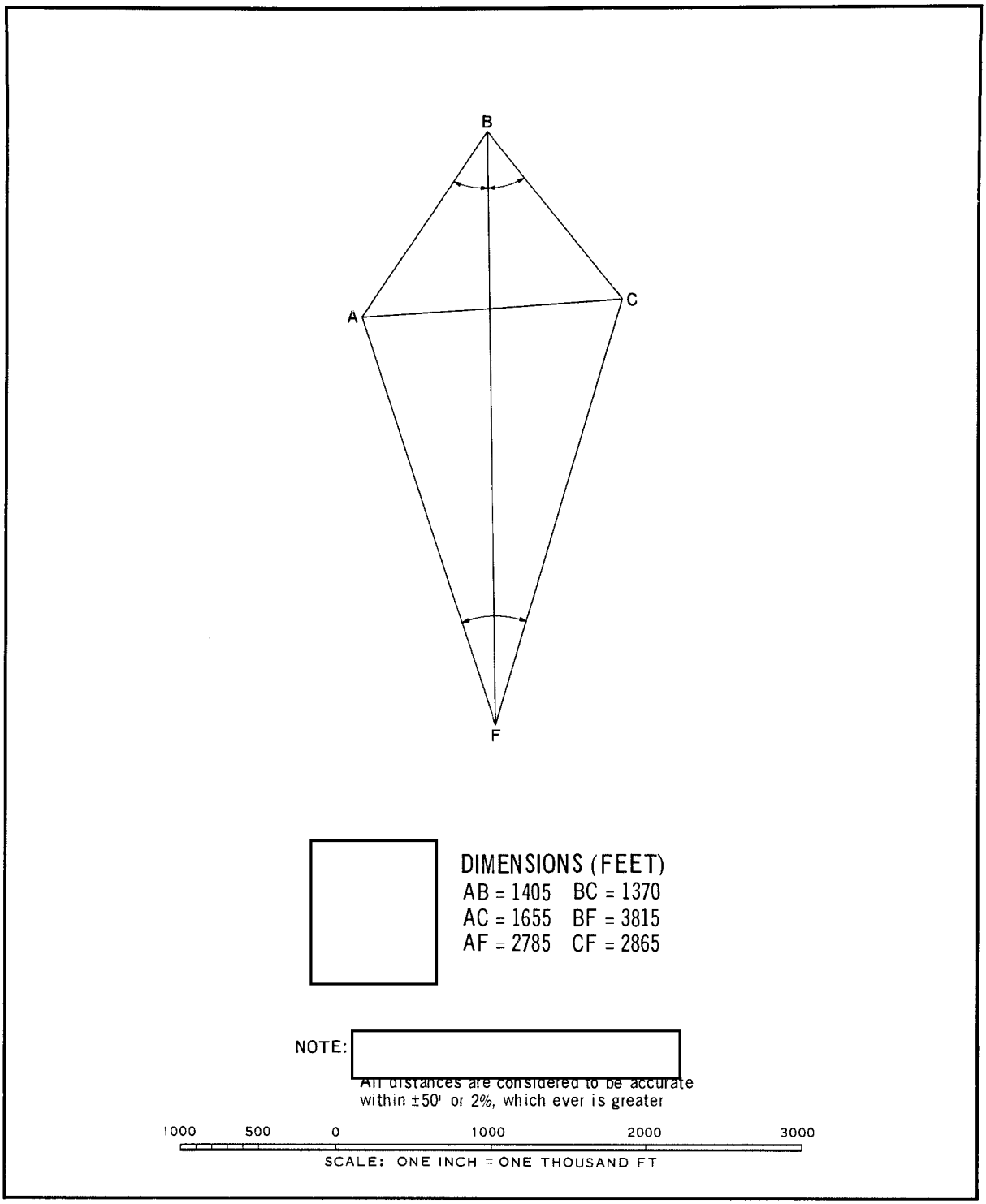

FIGURE 11. DIMENSIONS AND CRITICAL ANGLES, NIZHNIY TAGIL PROBABLE LONG RANGE SAM LAUNCH COMPLEX

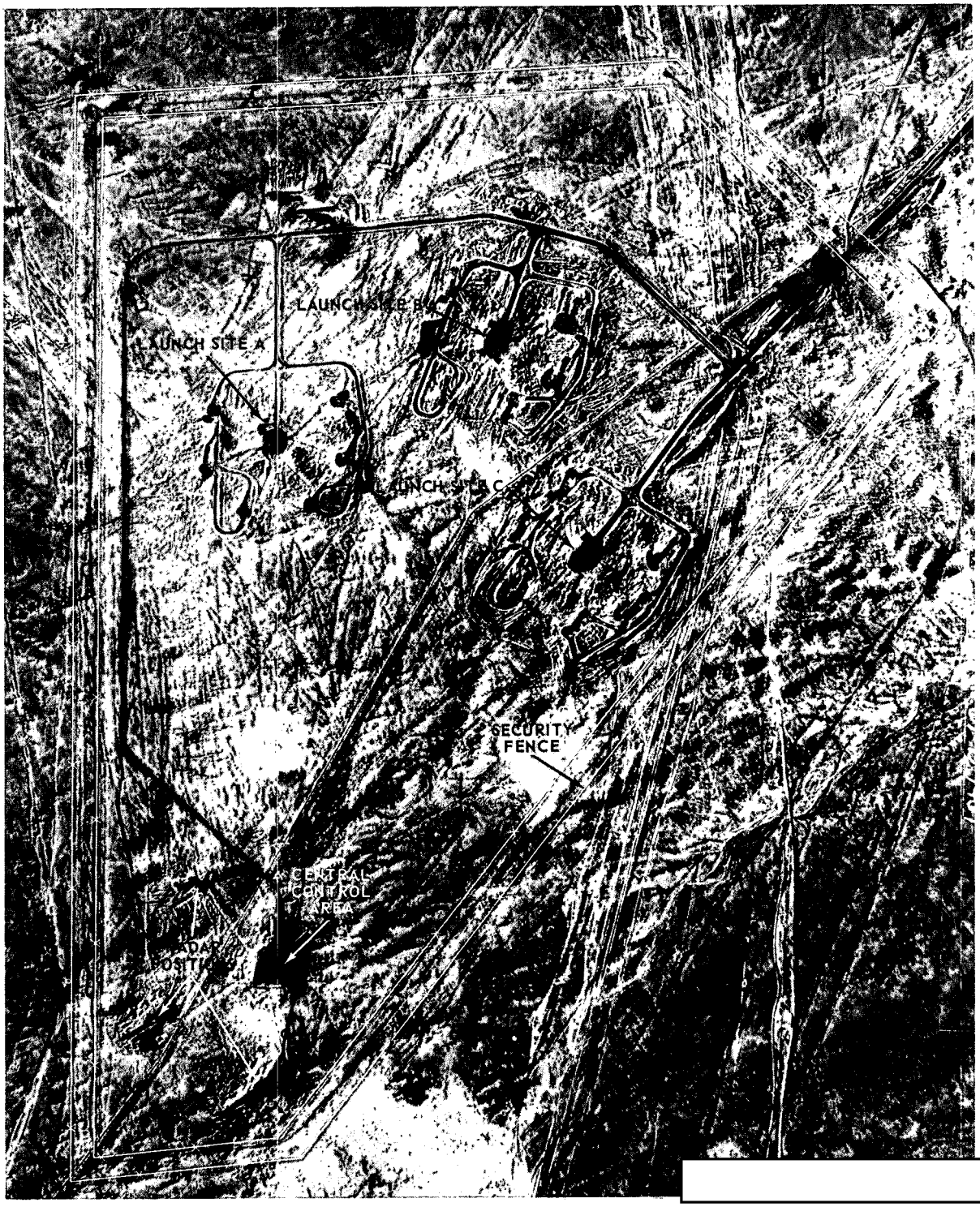

FIGURE 12. SARY SHAGAN PROBABLE LONG RANGE SAM COMPLEX 1

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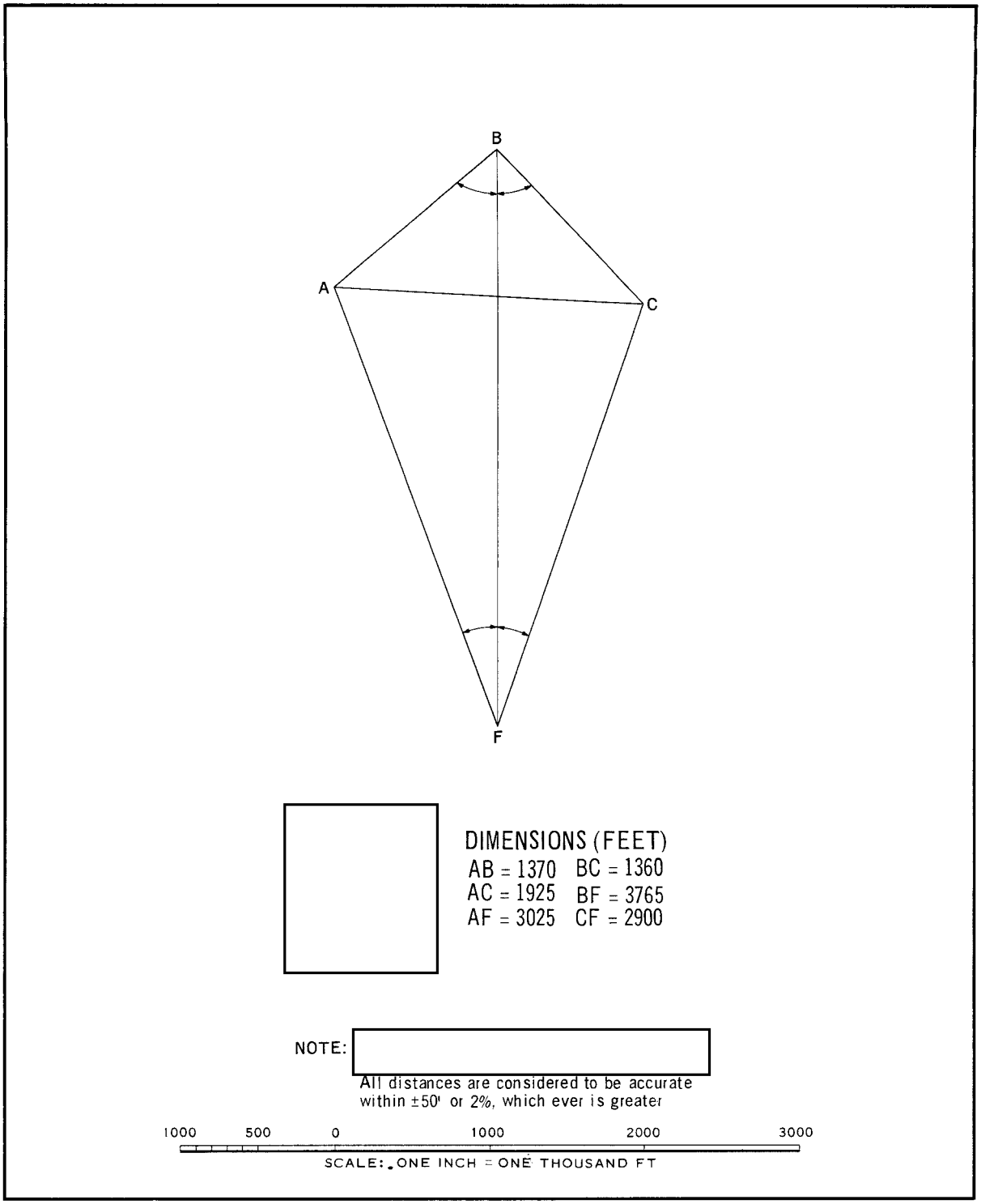

FIGURE 13. DIMENSIONS AND CRITICAL ANGLES, SARY SHAGAN PROBABLE LONG RANGE SAM COMPLEX 1,

FIGURE 14. SARY SHAGAN PROBABLE LONG RANGE SAM COMPLEX 2

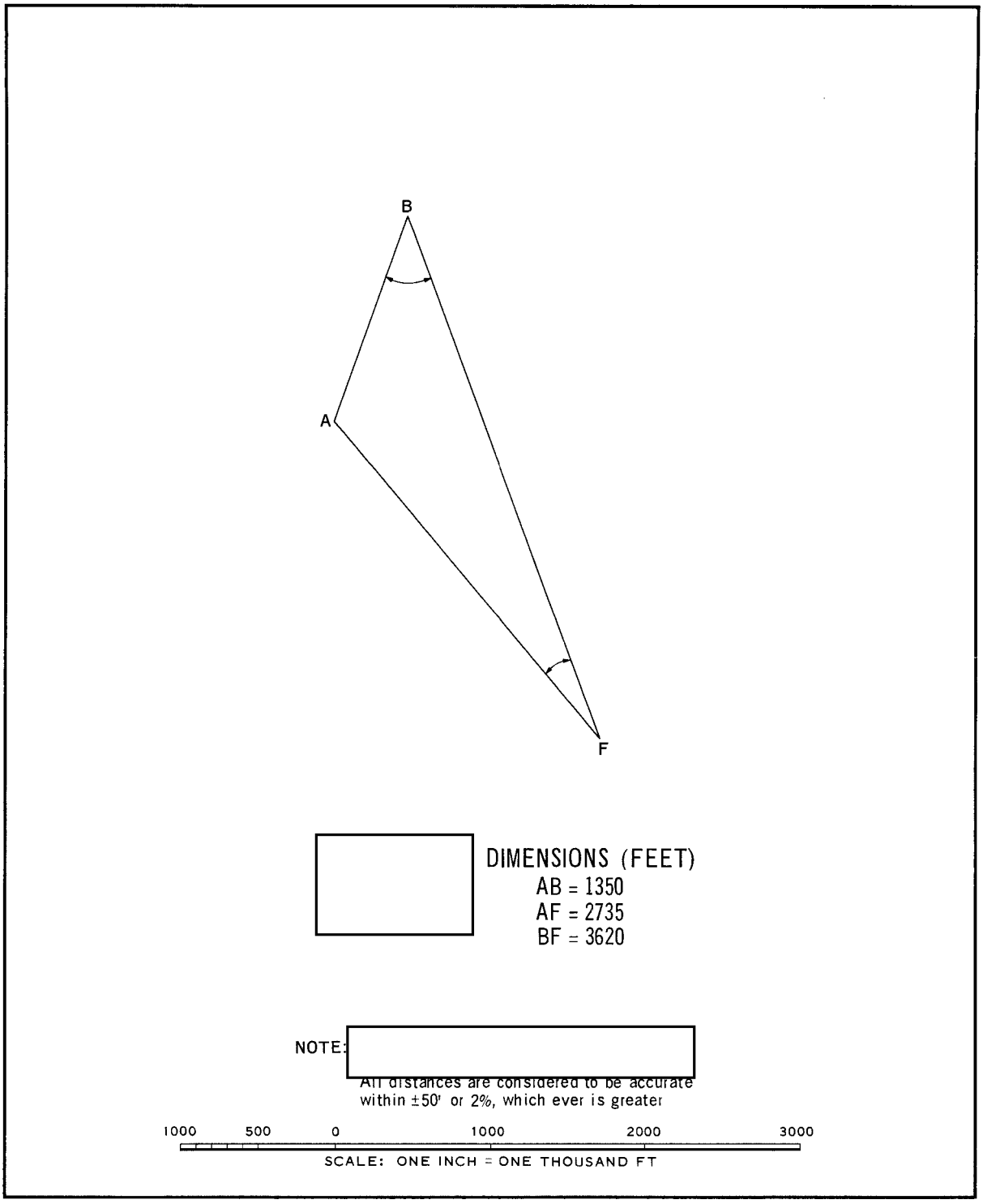

FIGURE 15. DIMENSIONS AND CRITICAL ANGLES, SARY SHAGAN PROBABLE LONG RANGE SAM COMPLEX 2,

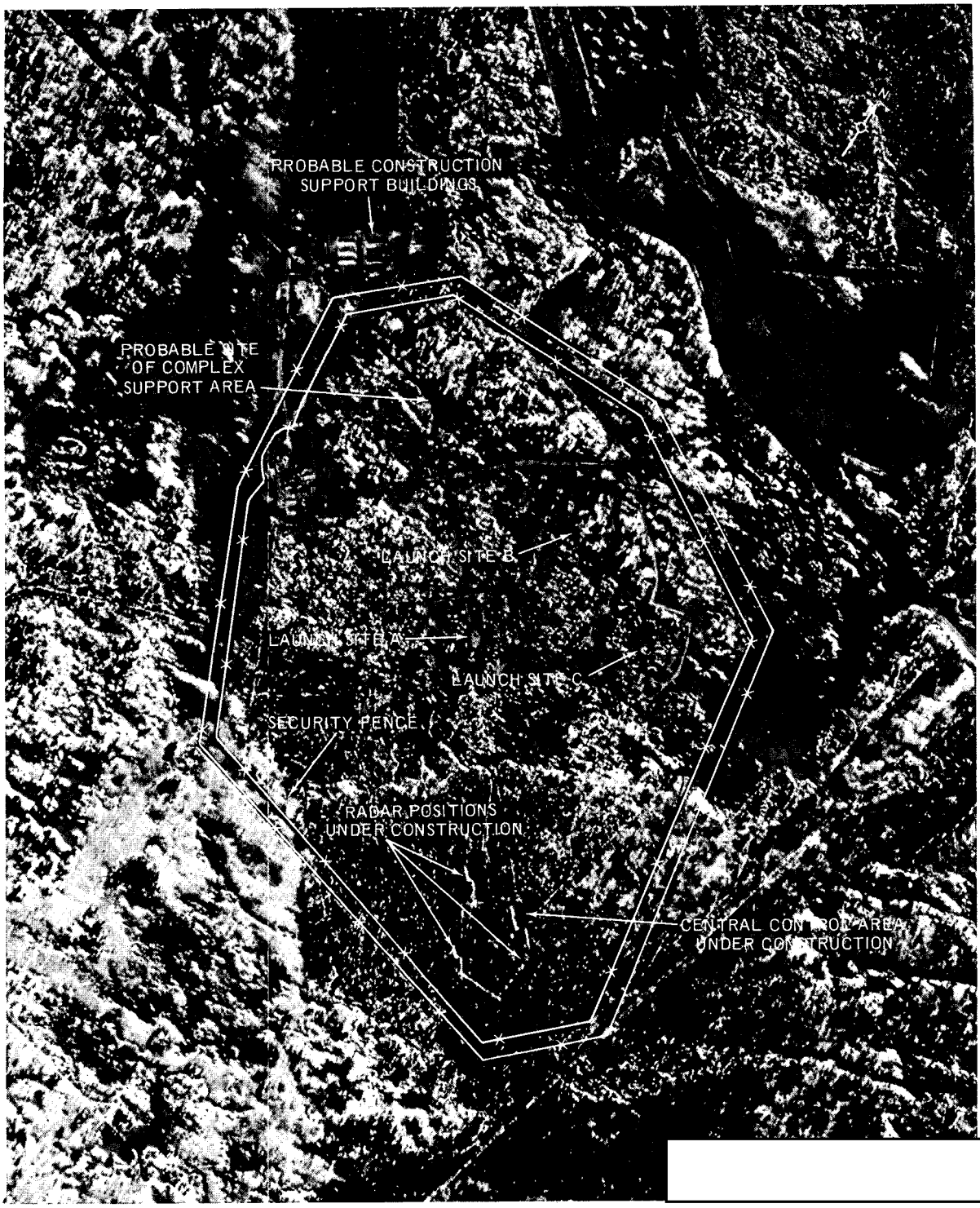

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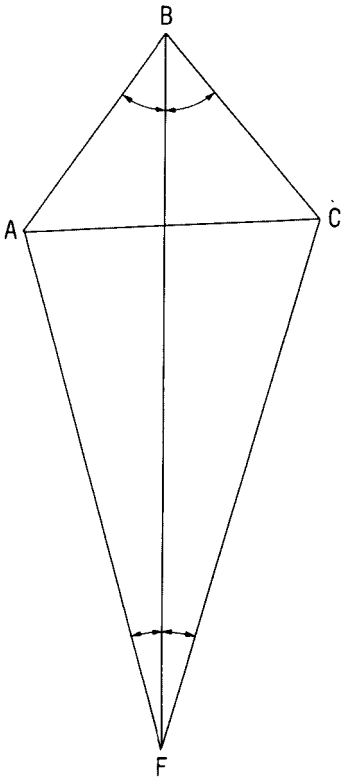
FIGURE 16. SVERDLOVSK PROBABLE LONG RANGE SAM LAUNCH COMPLEX



ANGLES	DIMENSIONS (FEET)	
ABF = 35°	AB = 1250	BC = 1255
AFB = 15°	AC = 1545	BF = 3785
	AF = 2765	CF = 2905

NOTE:

All distances are considered to be accurate within ±50' or 2%, which ever is greater

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SCALE: ONE INCH = ONE THOUSAND FT

FIGURE 17. DIMENSIONS AND CRITICAL ANGLES, SVERDLOVSK PROBABLE LONG RANGE SAM LAUNCH COMPLEX

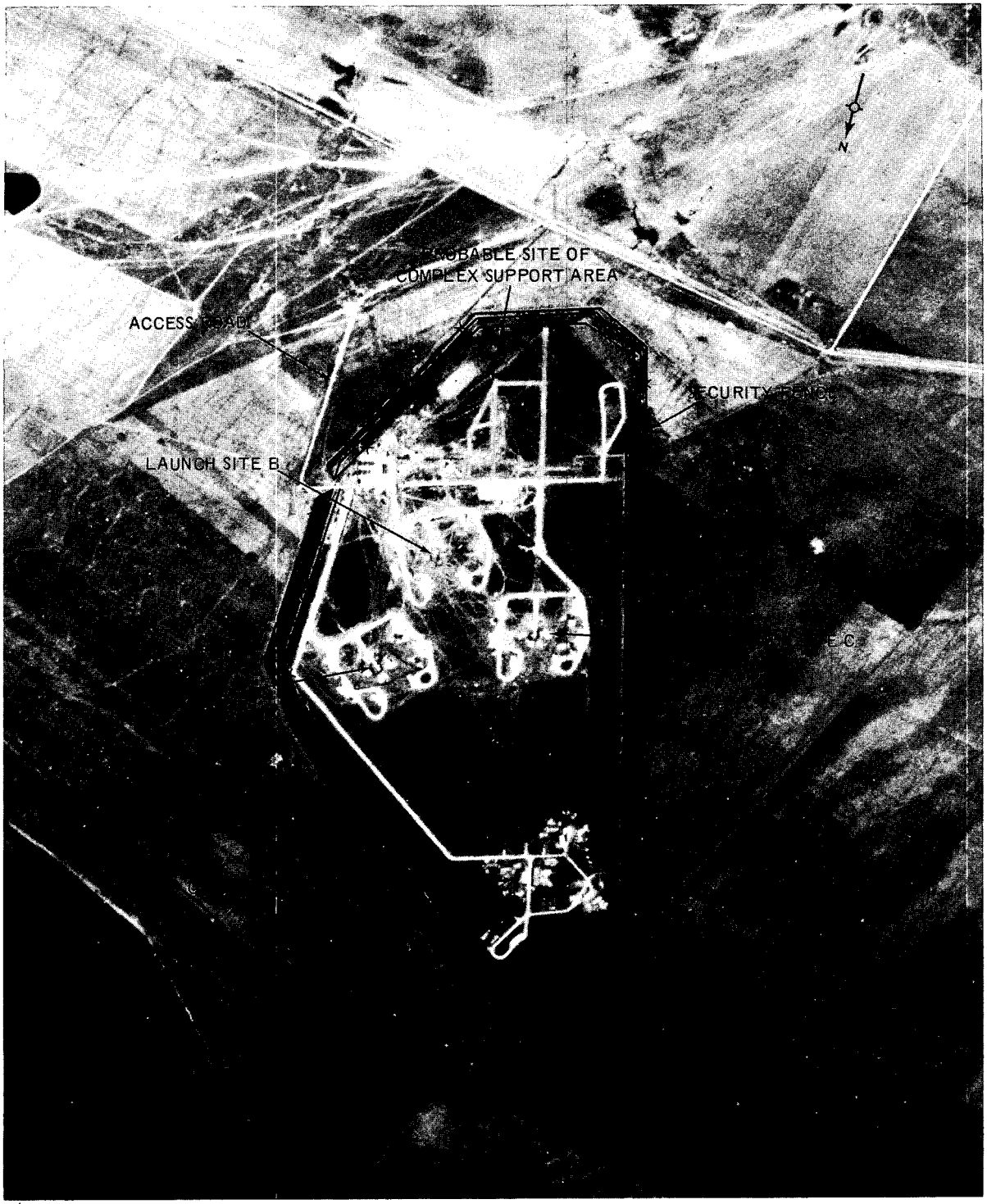

FIGURE 18. FEODOSIYA PROBABLE LONG RANGE SAM LAUNCH COMPLEX

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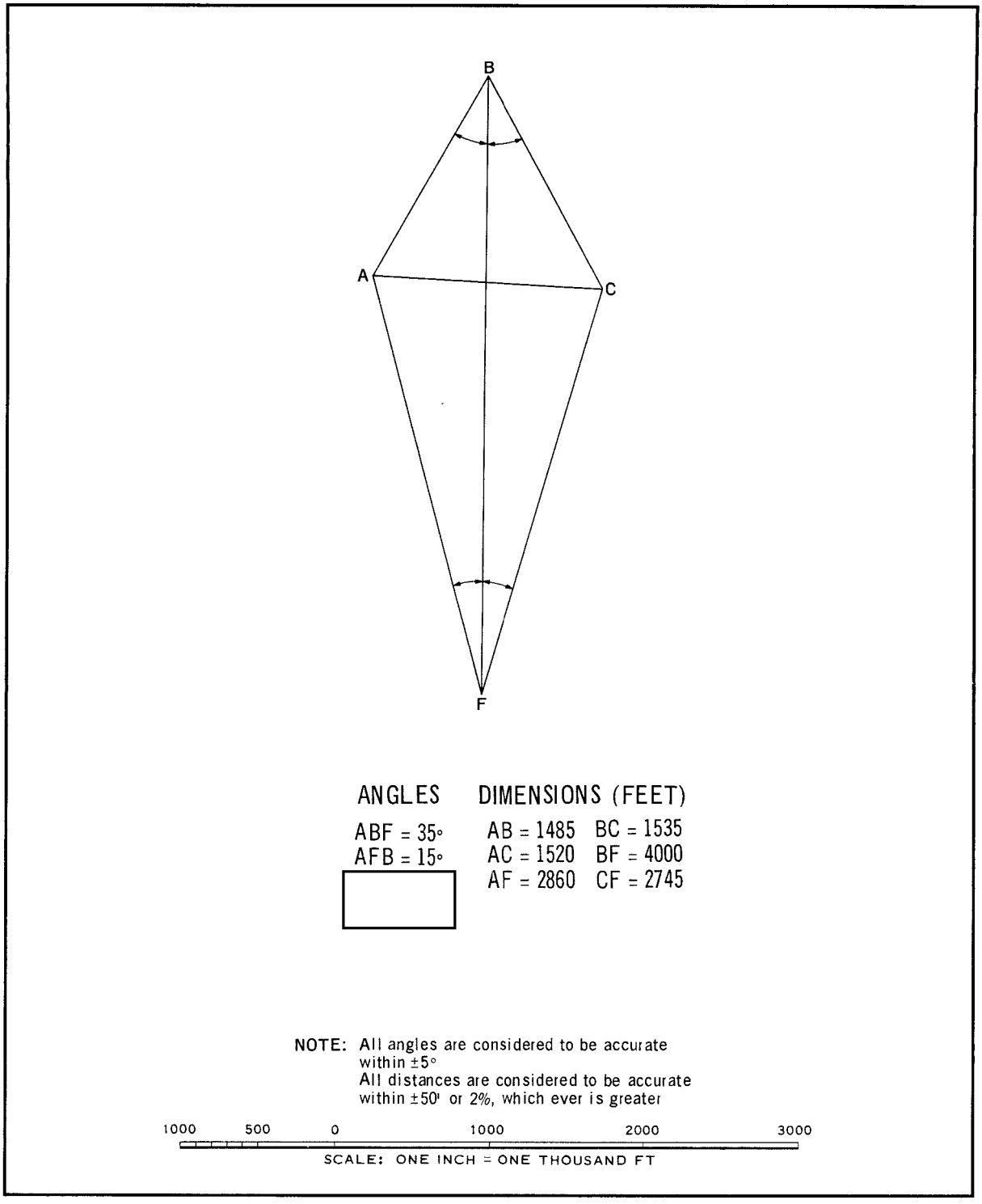

FIGURE 19. DIMENSIONS AND CRITICAL ANGLES, FEODOSIYA PROBABLE LONG RANGE SAM LAUNCH COMPLEX

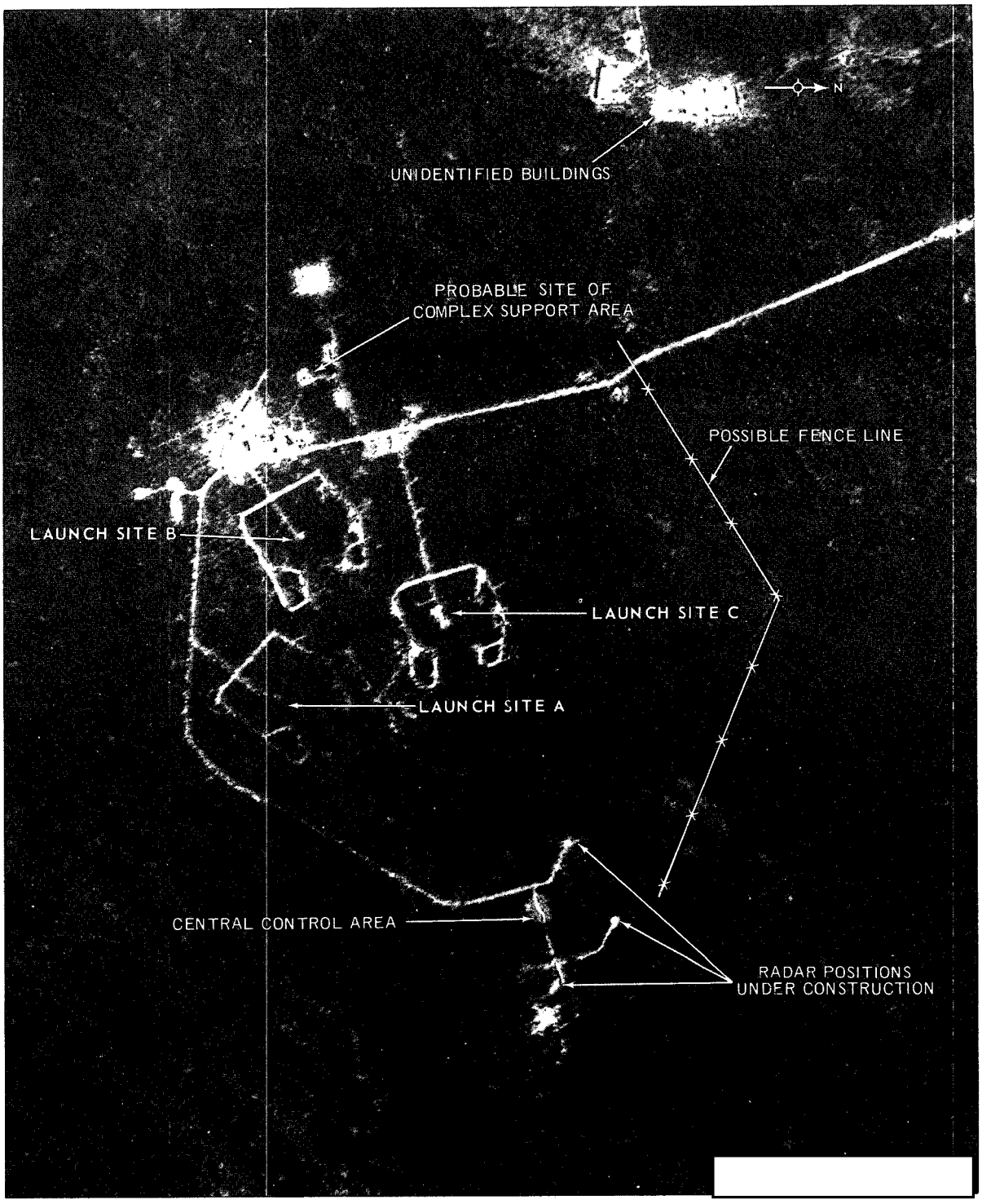

FIGURE 20. NIZHNYAYA TURA PROBABLE LONG RANGE SAM LAUNCH COMPLEX

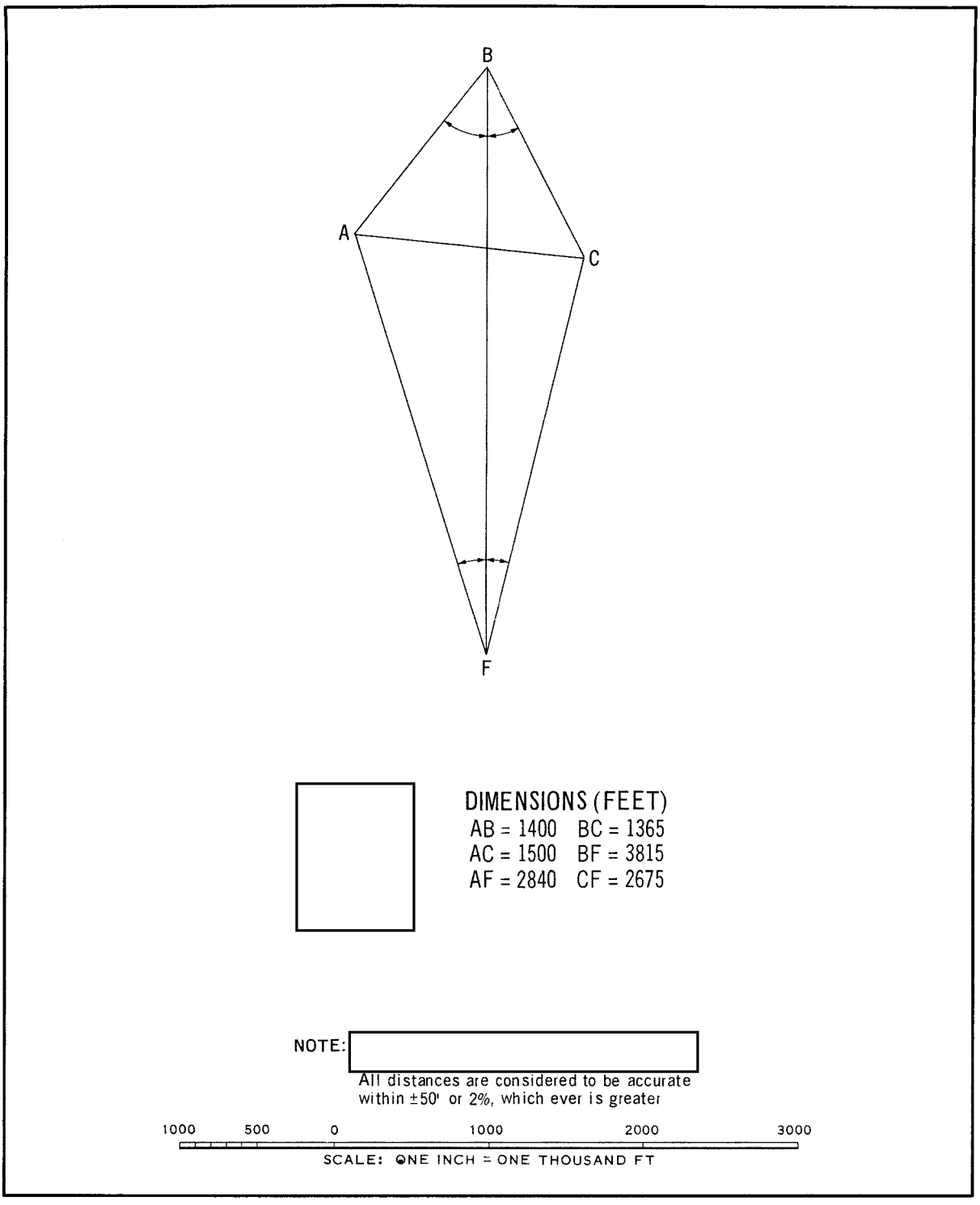

FIGURE 21. DIMENSIONS AND CRITICAL ANGLES, NIZHNYAYA TURA PROBABLE LONG RANGE SAM LAUNCH COMPLEX

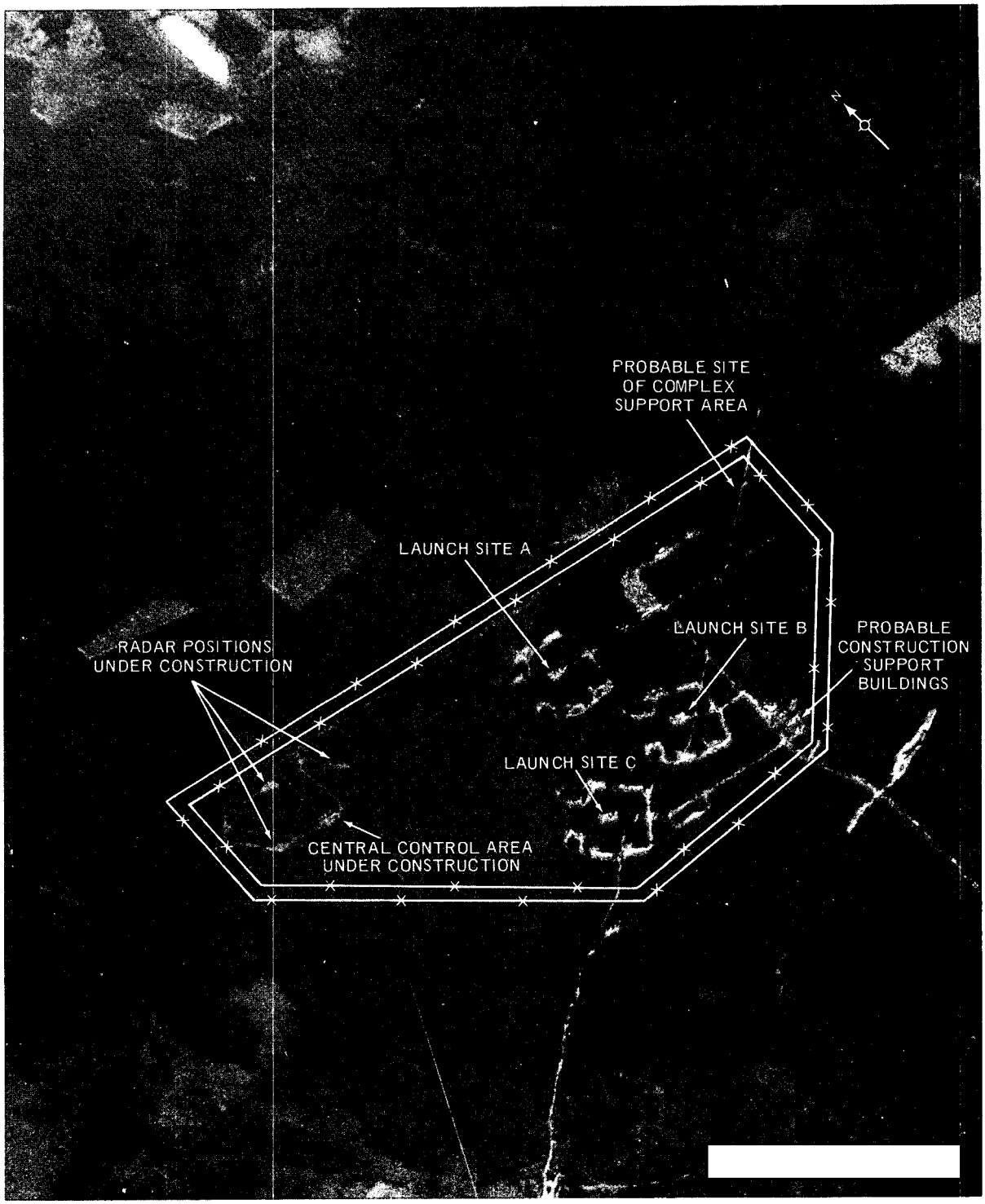

FIGURE 22. KIMRY PROBABLE LONG RANGE SAM LAUNCH COMPLEX

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25X1

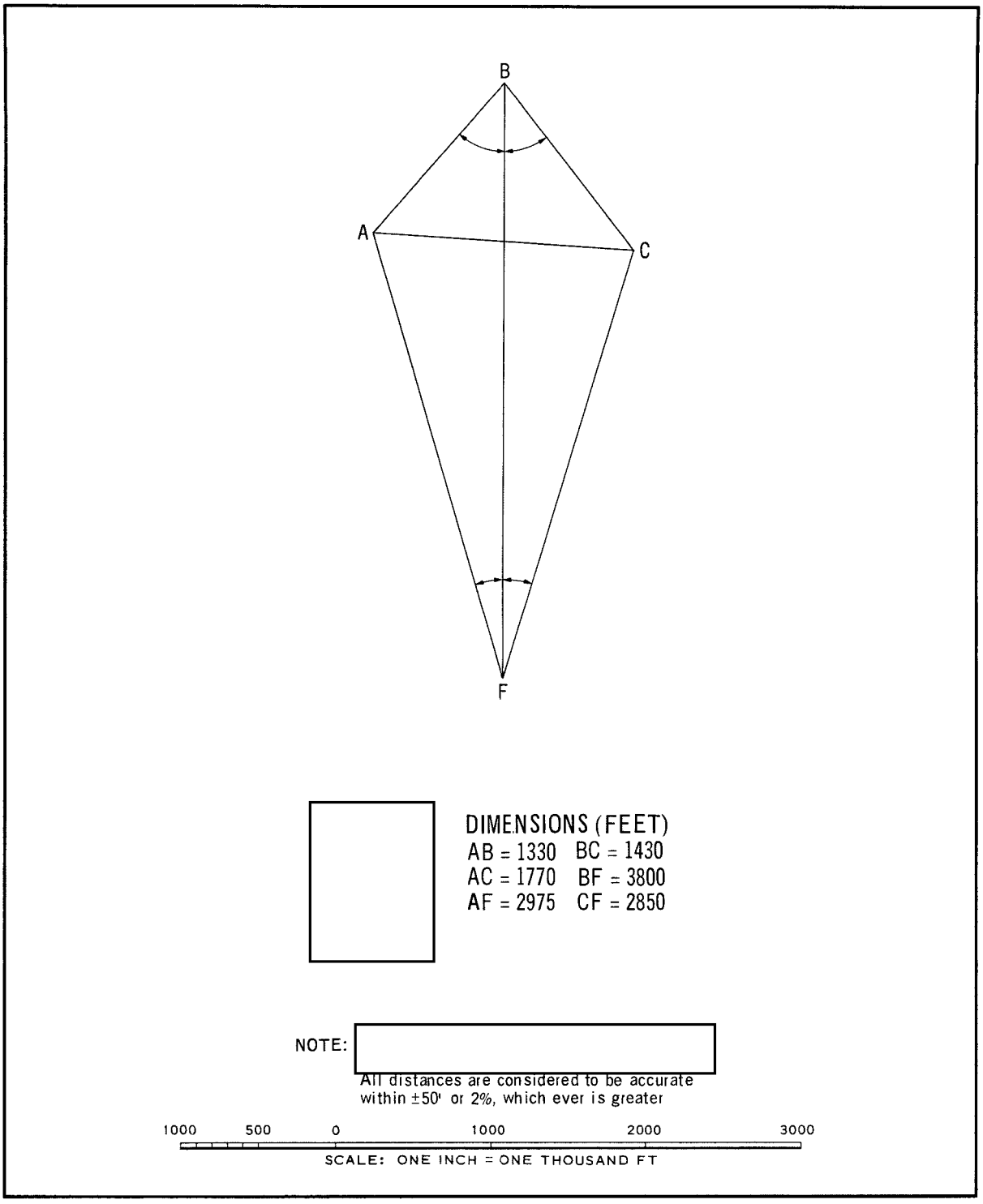

FIGURE 23. DIMENSIONS AND CRITICAL ANGLES, KIMRY PROBABLE LONG RANGE SAM LAUNCH COMPLEX

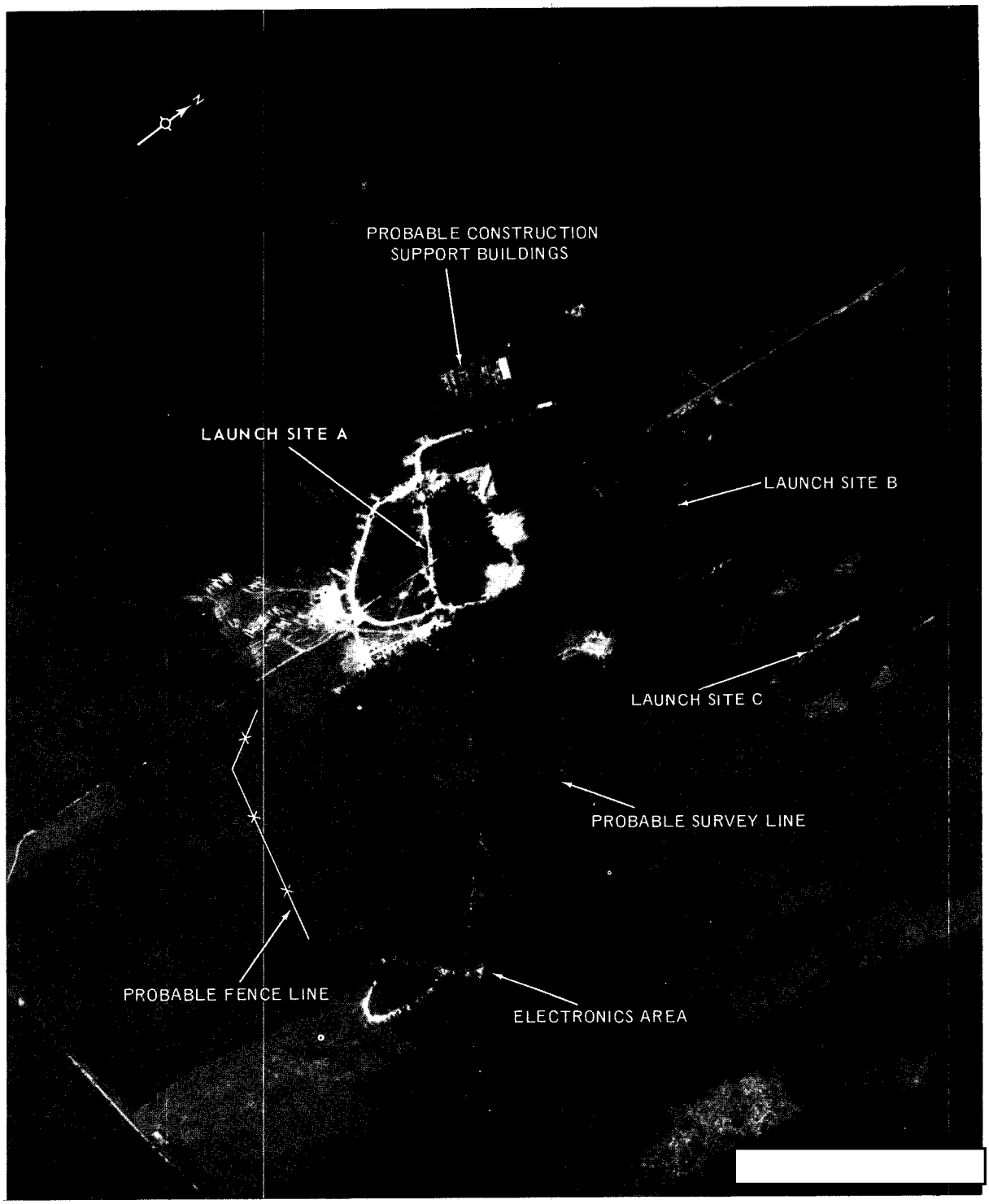

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FIGURE 24. PERESLAVL-ZALESSKIY PROBABLE LONG RANGE SAM LAUNCH COMPLEX

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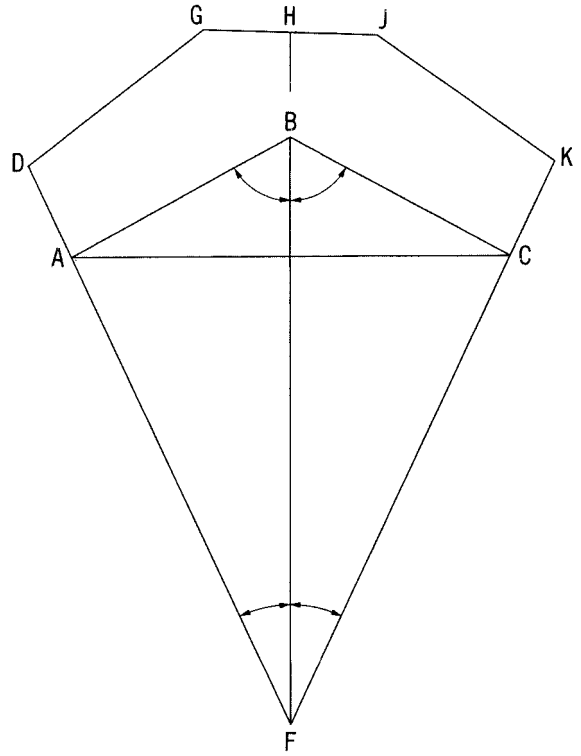

DIMENSIONS (FEET)

AB = 1255	BC = 1215	GH = 430
AC = 2170	BH = 555	HJ = 445
AD = 520	CF = 2615	JK = 1145
AF = 2690	CK = 535	
BF = 3005	DG = 1100	

NOTE

All distances are considered to be accurate within ±50' or 2%, which ever is greater

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SCALE: ONE INCH = ONE THOUSAND FT

FIGURE 25. DIMENSIONS AND CRITICAL ANGLES, PERESLAVL-ZALESSKIY, PROBABLE LONG RANGE SAM LAUNCH COMPLEX

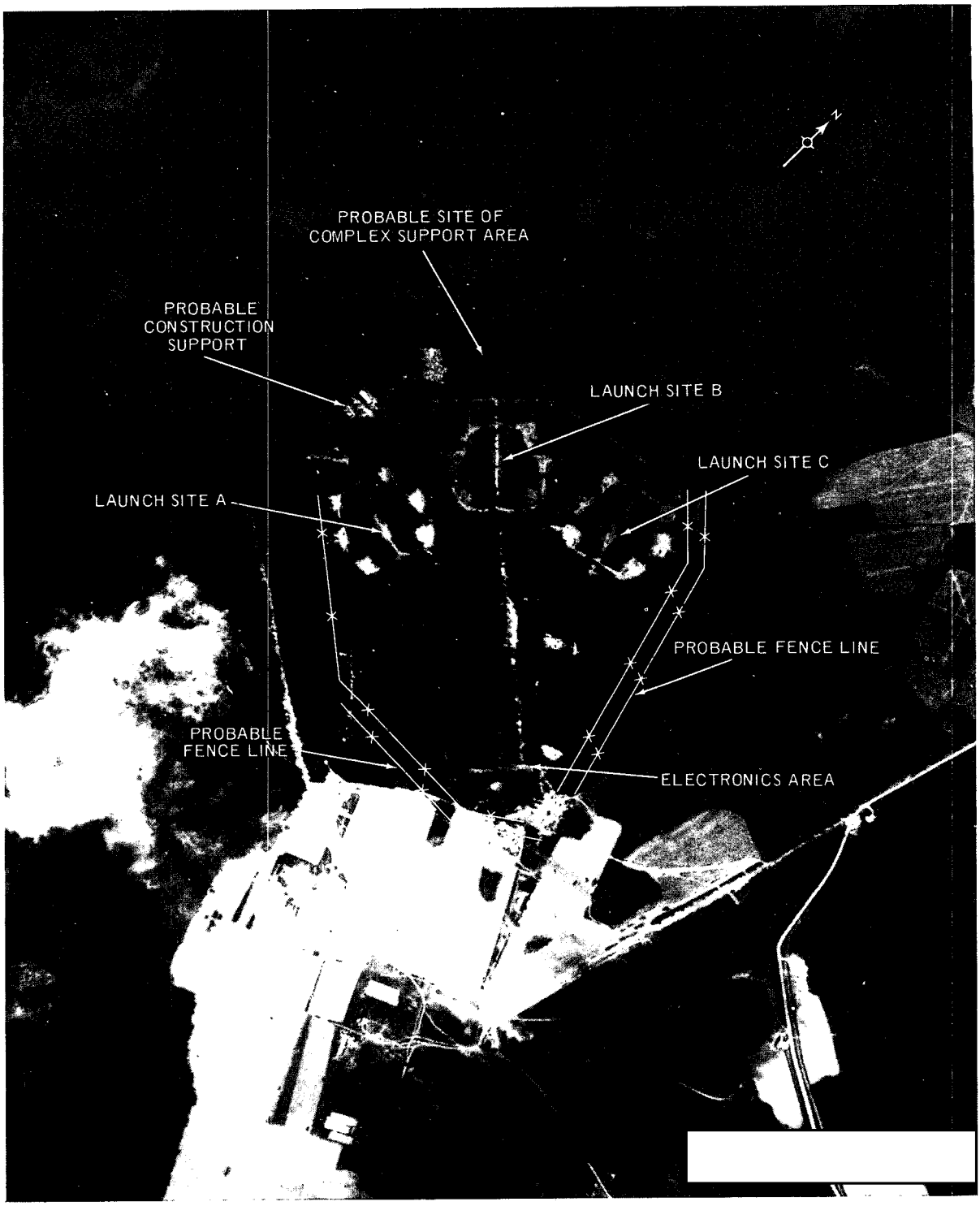

FIGURE 26. KALININ PROBABLE LONG RANGE SAM LAUNCH COMPLEX

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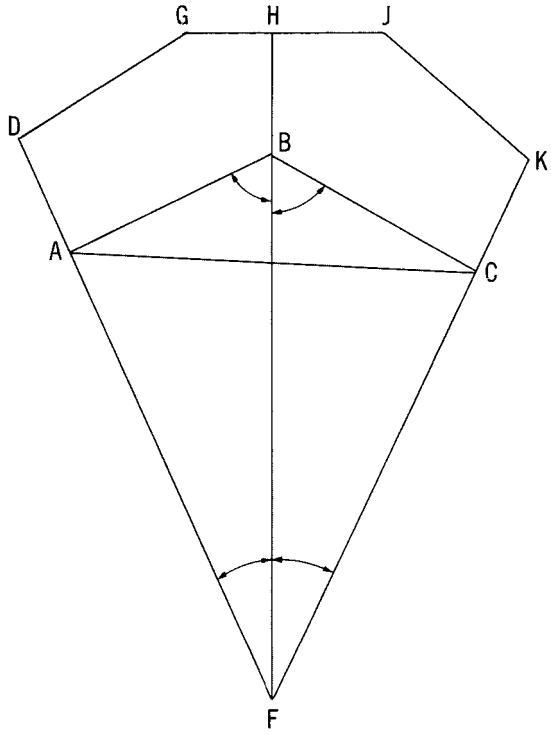

ANGLES	DIMENSIONS (FEET)		
	AB = 1195	BF = 2870	GJ = 1080
	AC = 2095	CF = 2485	HF = 3500
BFC = 25°	AD = 675	CK = 640	JH = 530
CBF = 60°	AF = 2575	DF = 3250	JK = 1040
	BC = 1200	DG = 1005	KF = 3145
		GH = 550	

NOTE:

All distances are considered to be accurate within ±50' or 2%, which ever is greater

1000 500 0 1000 2000 3000

SCALE: ONE INCH = ONE THOUSAND FT

FIGURE 27. DIMENSIONS AND CRITICAL ANGLES, KALININ PROBABLE LONG RANGE SAM LAUNCH COMPLEX

FIGURE 28. BABAYEVO PROBABLE LONG RANGE SAM LAUNCH COMPLEX

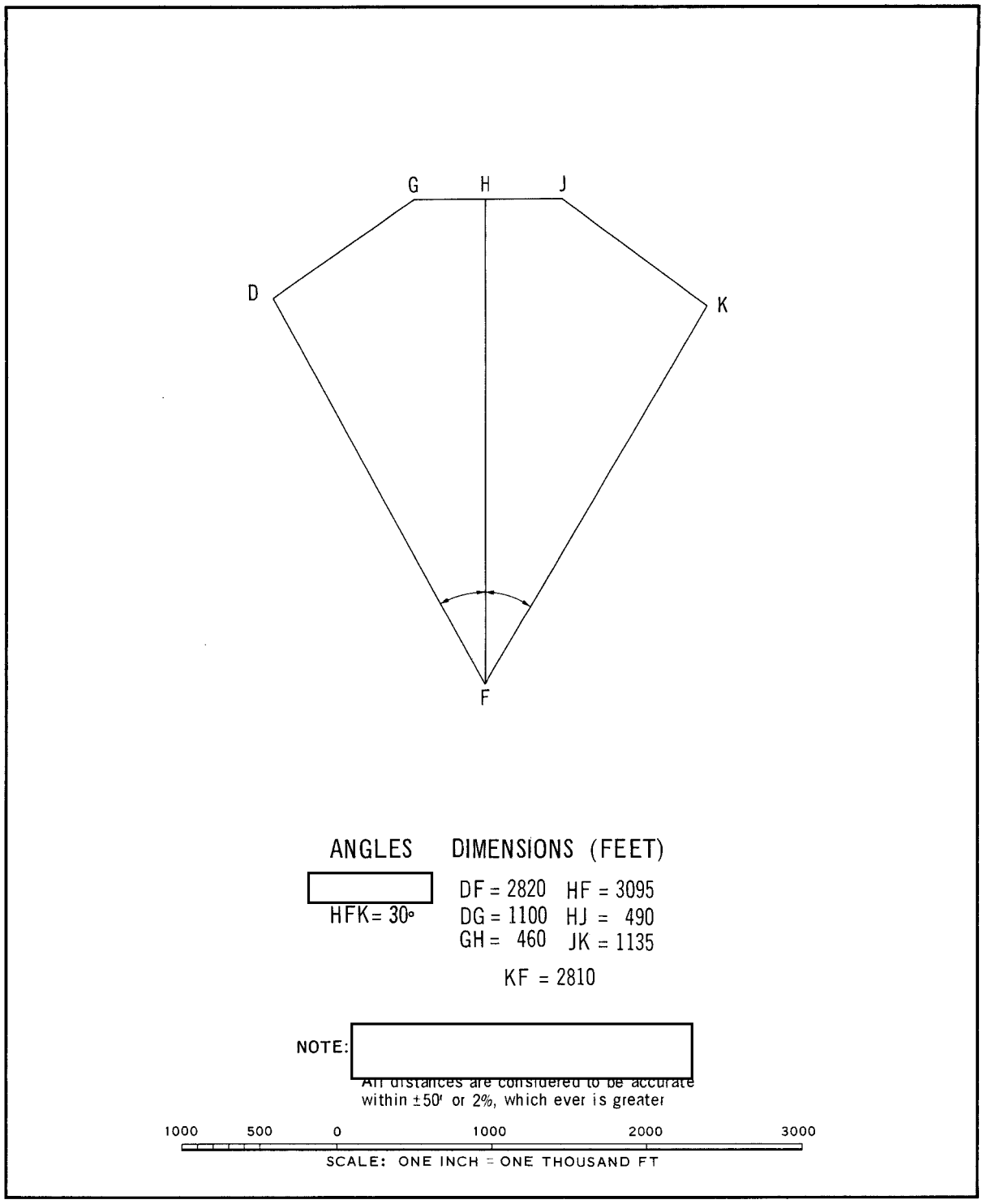

FIGURE 29. DIMENSIONS AND CRITICAL ANGLES, BABAYEVO PROBABLE LONG RANGE SAM LAUNCH COMPLEX

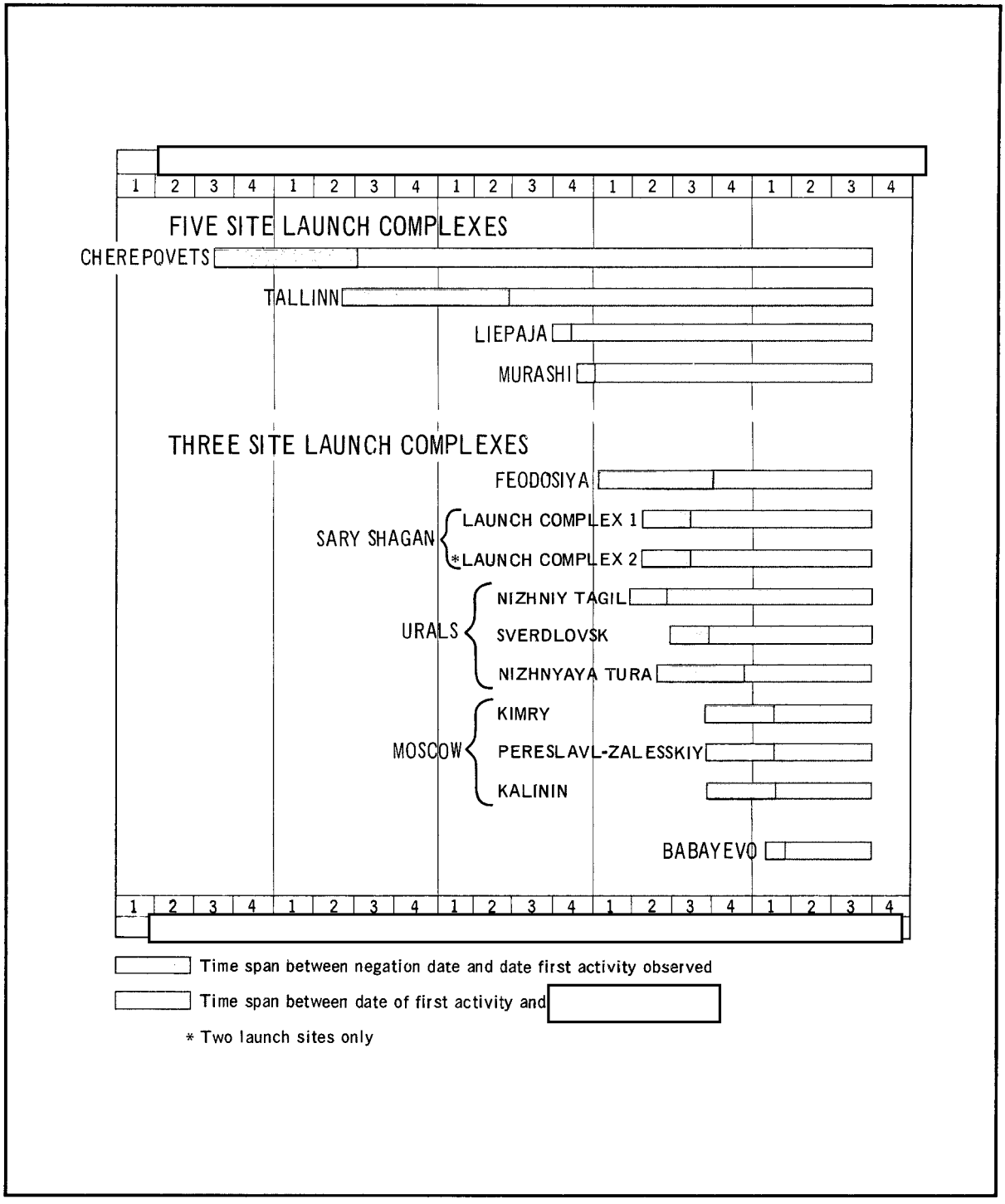

FIGURE 30. DEPLOYMENT TIMING OF PROBABLE LONG RANGE SAM COMPLEXES